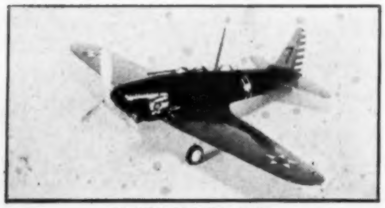
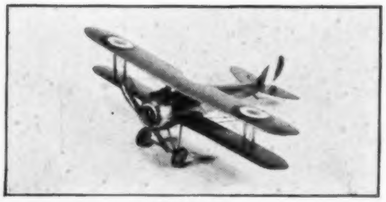

MODEL
AIRPLANE
NEWS
8th Year of Publication
JUNE
1936
20c
Kotula
Dewoitine D-535 Fighter

!!Sensational Price Reduction!!

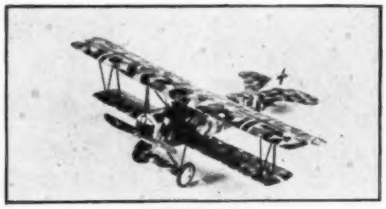
Hawk's famous 1/4 inch solid scale kits are now individually priced to meet everyone's purse. The ever increasing demand for HAWK kits by both dealers and individuals has so increased production that price reductions are in order.



CONSOLIDATED P 30

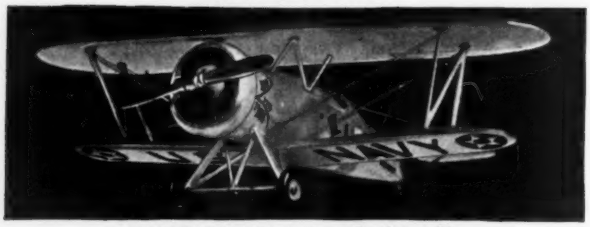


NIEUPORT 28

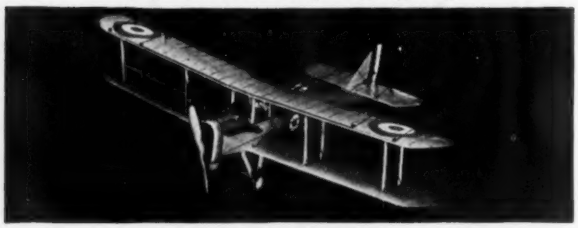


FOKKER D 7

VOUGHT V-65



BOEING F4B-4 (re-designed)



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The Most Complete Solid Wood Scale Kits on the Market

Each Hawk Kit contains all wood parts, as fuselage, wings, stabilizer, and rudder, CUT TO OUTLINE SHAPE. Die cast machine guns, propellers and wheels are furnished in each kit. Kits requiring radial motors have die cast motors included. All sets have formed metal seats, good paint, glue, insignia and real scale plans. PROOF of this can be seen in these pictures.

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40 Cents Each

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F.E. 2.B. (1915)	LOCKHEED VEGA

35 Cents Each

BOEING P-26 A	BOEING P-12-F
BOEING F.4.B.4.	SUPERMARINE
CONSOLIDATED P-30	B/J. P-16

30 Cents Each

HAWKER SINGLE-SEATER	NIEUPORT 28
HAWKER FURY	ANSALDO S.V.A.
FOKKER TRIPLANE	NIEUPORT 17
SOPWITH PUP	CURTISS SWIFT
HAWK P-6-E	DE HAVILAND 5
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MONOCOUPE	HAWK P-5
ALBATROSS	SHIPBOARD FIGHTER

25 Cents Each

WESTLAND WAGTAIL	CURTISS RACER
NAVY RACER	HALBERSTADT
S.E.5	FOKKER D-8
PFALZ D-3	SPAD 13
SOPWITH CAMEL	HOWARD MIKE

NOTE: Add 15% for postage on total order. No order for less than 50 cents accepted. Send remittance with MONEY ORDER only.

DEALERS: Handle the Hawk Line for substantial sales.

Hawk Model Aeroplane Co.

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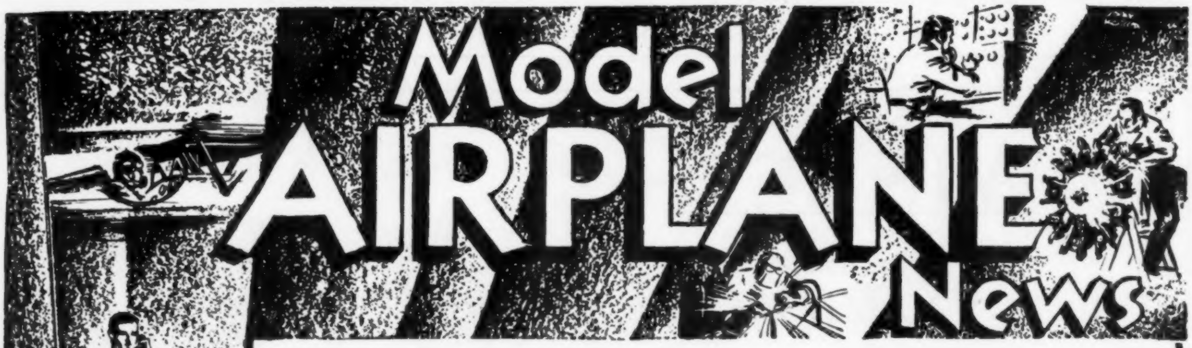

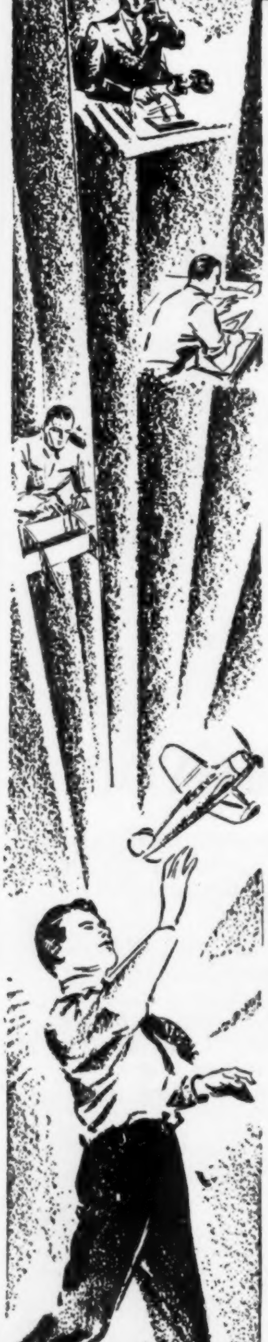

7th YEAR OF PUBLICATION

VOL. XIV *NO. 5*

Edited by Charles Hampson Grant

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JUNE, 1936

In Our Next Issue

Manley Mills presents an extremely interesting and enlightening feature in **The Development of the Light Plane.** This may help you to build yours.

Building a Flying Fairey Fantome, by Alan D. Booton and Ralph Pickard, will describe how you can create thoroughly tested flying scale model of a famous British Fighter.

Philip Zecchitella takes you behind the scenes and tells you the highlights of the "model" life of Vernon Boehle, in **The Model Builders' Hall of Fame.**

Those who like to build and fly simple experimental models will enjoy **A Test Model for Beginner or Expert,** by Raleigh T. Daniel.

Julius Unrath presents plans for a fine small gas job. It is well designed.

"Gas Lines" and Air Ways will bring you intimate news and information from model builders throughout the world.

Proportioning Your Model Plane for Stability—Part No. 3 will give complete outlines for model design. Mr. Chas. Grant is the author.

Other features will be presented that you will wish to see and read; such as Frontiers of Aviation. Plans of the Curtiss Shrike and a fine contest model for balmy summer days.

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$1.65 in Canada. All other countries $2.50 per year.

THIS OFFER POSITIVELY EXPIRES JUNE 15

This is the offer of a lifetime—Anyone buying the famous "Baby Cyclone" engine during this period can secure the "California Chief" Kit and propeller at a special combination price of $5.75—a total of only $21.50 for everything. There is nothing else to buy—yet the price is what you have to pay for a bare engine elsewhere. ● But Hurry! Such a sensational offer can't last. Unless your order is post marked before midnight June 15, 1936, we cannot supply you. Remember the deadline.
Play safe, send coupon today!

THIS IS WHAT YOU GET

1. "Baby Cyclone" Engine complete including gas tank, coil, timer and condenser, mounted on wooden base after actual run-in test ready to install in the completed kit. Speed from 500 to 4000 R.P.M., develops 1/6 H.P. Runs 17 to 20 minutes on one oz. of gas. Weight complete 10½ oz. Backed by a responsible organization.

2. "California Chief" Kit, specially designed for "Baby Cyclone" engines—5 ft. wing span, assembled landing gear with 3½" air wheels, cut-to-shape fuselage, tail surfaces and ribs, silk for covering, dope, glue, etc., and full size plan instructions.

3. Special 13" hi-polish hardwood propeller engineered for the "Baby Cyclone" to develop maximum horsepower.

Aircraft Industries, Major C. C. Moseley, Pres.
Grand Central Airport, Glendale, California

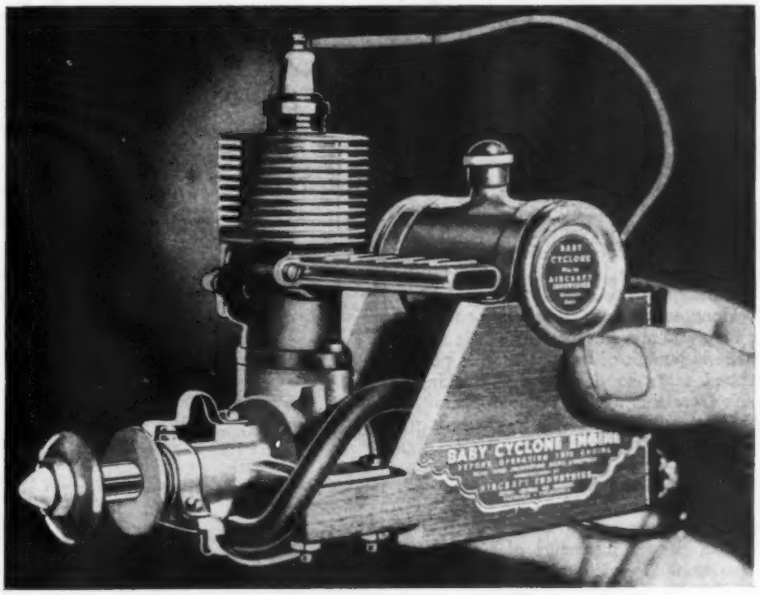
As advertised, send me your complete outfit of engine at $15.75 together with kit and prop. at special price of $5.75 for which I enclose P. O. money order for $21.50. I understand this offer expires June 15, 1936.

Name____________________
Address____________________
☐ Engine only $15.75 ☐ Kit only $7.90
☐ Propeller only $1.50

AIRCRAFT INDUSTRIES
GRAND CENTRAL AIR TERMINAL
Major C. C. MOSELEY, Pres. *GLENDALE, CALIFORNIA*

★ ★ ★ EXTRA!!

$200.00 IN CASH FOR "BABY CYCLONE" WINNERS



MAJ. C. C. MOSELEY OFFERS BIG PRIZES TO "BABY CYCLONE" WINNERS AT NATIONALS

Equip Your Model Now

Win the 1936 National Championship with a "Baby Cyclone" Engine and win $100.00! There are two prizes — $100.00 cash to the winner between 16 and 21 years of age and $100.00 cash to the winner over 21 years of age.

These two cash prizes are offered to the winners in the respective age classes of the Outdoor Gasoline Powered Contest for cabin r. o. g. models provided they are powered with "Baby Cyclone" internal combustion engines. These prizes will be awarded only to the official N. A. A. winners.

Major C. C. Moseley

Major C. C. Moseley, world-war flyer, winner of the first International Pulitzer Prize Airplane Race, and President of Aircraft Industries and Curtiss-Wright Institute of Aeronautics at Glendale, California, is offering these prizes without any strings attached. The actual cash is already on deposit with the Los Angeles Chamber of Commerce and will be sent airmail to the winners the day after the meet, but the models must be powered with "Baby Cyclone" Engines.

EVERYONE MAY ENTER

Get ready now to win $100.00 at the Nationals June 30 to July 2, 1936. All you have to do is equip your model with a "Baby Cyclone" Engine — the new sensational power plant that has been consistently winning recent meets. You have plenty of time to build your model, but start on it immediately so that you can test it and tune it up before the meet. Order your "Baby Cyclone" today either direct or from your nearest dealer. You can obtain immediate delivery. Send the coupon on the opposite page today. Do not delay.

"BABY CYCLONES" ARE CONSISTENT WINNERS

Since their introduction only a few months ago "Baby Cyclone" Engines have already proved a sensation wherever they are flown, and have consistently won in competition.

At the recent 1936 San Diego, California, meet these economical little power plants won new fame for themselves by placing first, second and fourth against a field of 22 contestants. Flown by Mel Anderson the winning model was in the air 13 minutes 51 seconds and consumed less than one-third ounce of gasoline.

At the 1935 California State meet at Sacramento a "Baby Cyclone" model likewise won first place by flying 9 minutes 34 seconds on 6½ cubic centimeters of gasoline. This winning ship was built and flown by Bill Atwood.

These "Baby Cyclone" Engines run from 17 to 20 minutes on 1 ounce of gasoline. That is why they are consistent winners both for distant flight and in endurance meets.

RECORD-BREAKING PERFORMANCE BUILT INTO THIS ENGINE

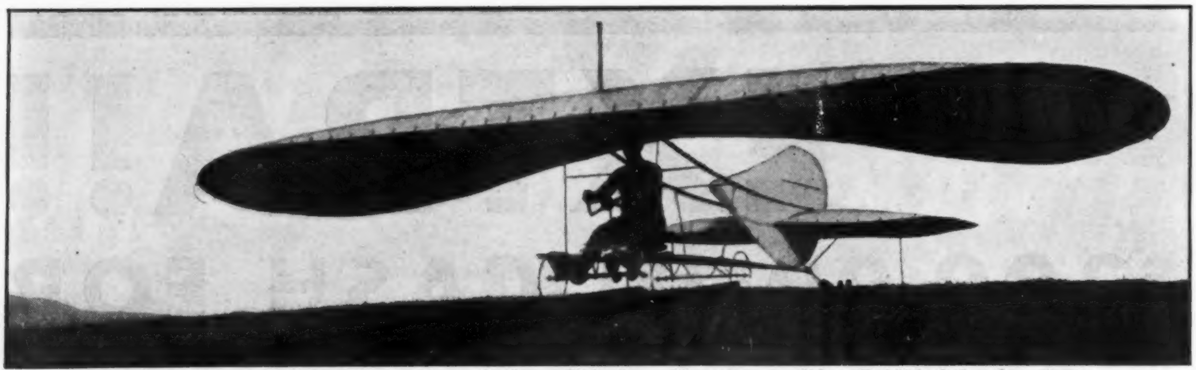
Engineers at Aircraft Industries spent years in developing and perfecting the "Baby Cyclone" Engine before it was offered to model builders. As a result the engine is scientifically correct, which means that it develops more power on less fuel and stands up longer.

More die-castings are purposely used in "Baby Cyclone" Engines since this is the best known precision method for manufacturing accurate small reliable parts. For strength and durability the "Baby Cyclone" has extra large oversize bearings, precision ground to .0005" clearance. The "Baby Cyclone" rotary valve is positive in action, eliminates "blow-back," and gives greater power and far more economy.

The positive "Baby Cyclone" special 2-oz. "Fire Cracker" Coil gives a red-hot spark under all conditions. This coil has over 1 mile of machine drawn copper wire wound into it. Another special feature of the "Baby Cyclone" is the gravity feed fuel system which permits installation of the tank in any advantageous location.

When you buy your engine don't be satisfied with anything less than the reliable "Baby Cyclone" at $15.75, which is backed by a large and responsible aircraft organization insuring satisfaction to you.

READ "BABY CYCLONE" AD ON OPPOSITE PAGE



Joseph C. Vierra on the starting track, ready for a flight in a Montgomery glider (Published for first time)

A Forgotten Pioneer

An Unusual Account of J. J. Montgomery's Experiments Including Information and Pictures Which Never Have Been Published Up to This Time

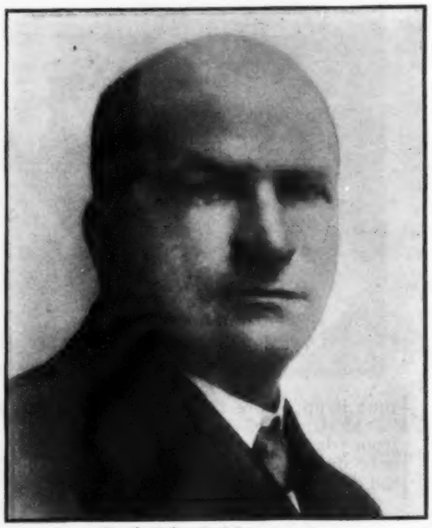
By LIEUT. H. B. MILLER, U.S.N.

NOTHING is truer than the adage that fame is fleeting. Yet it is strange that in this aviation age a man who contributed much to the early knowledge of aeronautics should have been so soon consigned to oblivion. The name of Professor John J. Montgomery awakens no recognition in the average man. Yet he and his students, in pursuit of their researches performed feats so daring, that, looking back from this age of reliable aircraft, we must admire their sheer pioneering courage.

This pioneer's early boyhood was spent in the San Francisco Bay area, the hills of which made it easy for him to study the flight of birds. He was fascinated with the mechanics of flight and often would spend hours at a time observing the soaring of seagulls and hawks. Not content to watch alone, he learned how to bend a piece of tin which would gain altitude when it was thrown in a whirling fashion.

In 1884, five years after his graduation from St. Ignatius College in San Francisco, he moved to the vicinity of San Diego and there he continued his personal observations of flight. Finally he felt prepared to construct himself a glider for human flight. At best, it was a dreadful contraption built of hickory, wire and muslin. It is of interest to note that on this machine he used a gull-wing. In spite of the weight of this craft, the daring youngster essayed a flight and managed to cover 600 feet before he faltered to earth, a happy though somewhat frightened young man. It must be observed that this flight occurred some eight years before the appearance of Lilienthal's gliders!

The aeronautical studies of Montgomery continued and he began to introduce mathematics into the engineering side of his work. All his experiments were carried out independently, at this time, and his name came to be associated with the then vague subject of aeronautics. Indeed, his fame had spread so that Octave Chanute, the name most often connected with gliders in the United States, called upon Montgomery to deliver a lecture to the Aeronautical Conference at the World's Fair held in Chicago in 1893.



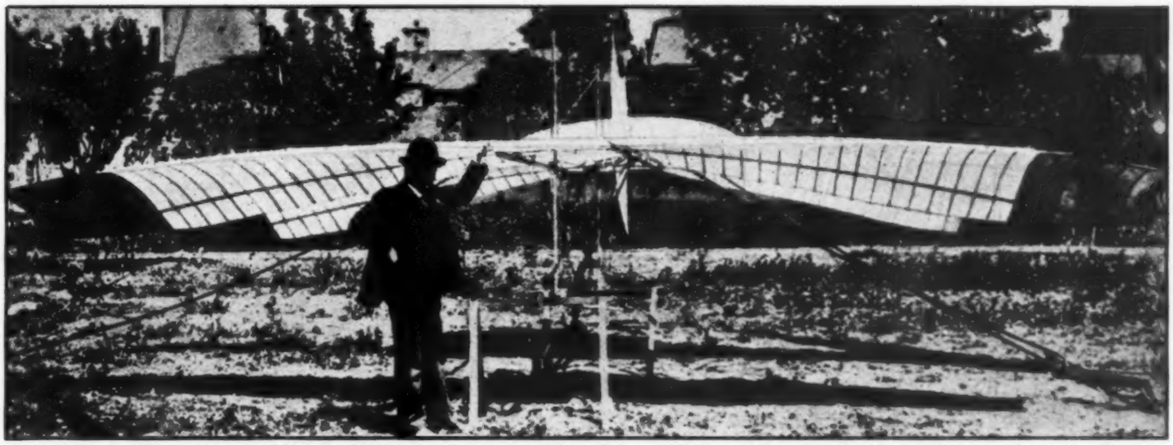
Prof. John J. Montgomery

At this time it became necessary for Montgomery to earn a livelihood and he accepted the chair of mathematics at Santa Clara University, a Jesuit institution. Here his fertile mind turned to all sorts of experiments. He paralleled Marconi's efforts with wireless and was successful in transmitting signals through the ether. But his original love came to the fore again, and he resumed his interest in the possibilities of human flight. The university authorities were most tolerant toward his experiments and permitted him to use an old shed for a workshop where much secrecy surrounded his efforts. It was whispered about that he was striving to extract gold from black sand, and, no doubt, at that time most people believed that this quest was just as sane as the possibility that people would some day fly.

The remarkable thing is that the Professor early recognized the necessity for a definite wing section rather than a flat surface, if maximum lift were to be obtained. He also realized that easy control must be provided before a glider could be used safely. His solution to this problem was wing-warping not unlike that of the Wright Brothers, a system which was being developed independently at the same time.

At this time—1904—Montgomery wrote, "My idea is that the sustaining surface is not alone to be considered, but there are important movements set up in the surrounding air which necessitate a peculiar form of

Prof. Montgomery in flight 6 ft. off the ground



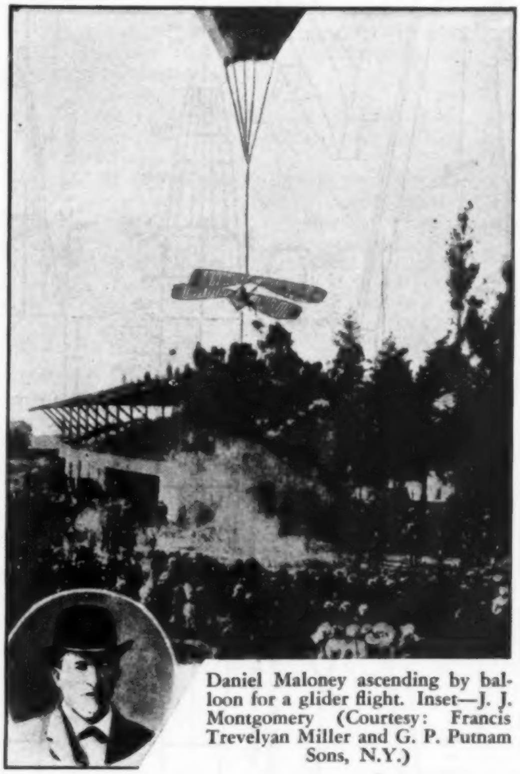
Prof. John J. Montgomery standing beside his tandem monoplane glider. (Courtesy, Francis Trevelyan Miller and G. P. Putnam Sons, N.Y.)

surface and adjustment. The central difference between that idea of mine and others is this: others have considered only the surface, while I have considered the surface, the movements set up in the surrounding air, and the form and position of the surface consequent upon these movements."

For test purposes, he would wander down to a nearby bridge which spanned a deep arroyo and there launch his small model gliders to their fate. His craft showed considerable promise and their performance distinctly improved from time to time as he learned more about their construction and design. By adjusting the controls before flight he could make them "twist" and "somersault" during their descent after which they would resume normal flight and float on until they reached the earth far below. Enthusiastic letters to his mother at this time describe his experiments as proof of his theories of aeronautics, but he bemoaned the fact that an arroyo wall invariably ended the flight of his models.

Then came a brilliant idea, with the result that the next product of his shop was a box kite. Attaching his most successful model to the kite, he sent it to a height of 400 feet and there released it. Obeying the setting of the controls as adjusted by Montgomery before the flight, the glider came to earth amid the happy shouts of its builder. The success of this experiment led the Professor to confide in some of his colleagues and the fathers were invited to witness some of the model flights. A contemporary publication reports the faculty as "being very enthusiastic" over what they saw.

For the most part, however, Montgomery's experiments were shielded from public gaze. The story is told that one student mustered up sufficient courage to investigate the mysterious doings in the workshop. So intrigued was he that he built himself a glider. While holding class one morning, Montgomery walked to the window of the room to investigate the source of much cheering by a portion of the student body. He was startled to see a tiny glider soaring from the roof. Enraged, he ran down and destroyed the model as well as delivering a verbal trouncing to the student who had the temerity to construct and fly the craft.



Daniel Maloney ascending by balloon for a glider flight. Inset—J. J. Montgomery (Courtesy: Francis Trevelyan Miller and G. P. Putnam Sons, N.Y.)

The moment Montgomery felt he had mastered the construction of models he began to build an experimental man-carrying glider. His secretive nature again came to the fore and unknown to his colleagues he slipped off to a ranch in the heart of the Santa Cruz mountains. This was close to a tract owned by the University, and the Professor had already investigated the aerological possibilities of the site. Here under ideal conditions and assisted by three brawny cowboys, sworn to secrecy, Montgomery worked day after day.

After each flight initiated by the running, perspiring ranch hands, the pilot adjusted his machine and learned the secret of the operation of its controls. While his knowledge advanced in direct proportion to the flying he did, he was still restricted by lack of altitude and the short flights came to an abrupt end when he wrenched his ankle in a gopher hole during a landing.

Sometime before this Montgomery had met the balloonist, T. S. Baldwin, who had attained considerable fame by his spectacular flights at country fairs and similar gatherings. Now, home from the ranch, Montgomery again chanced to meet Baldwin, and contrary to his normal procedure, discussed his recent glider experiments with the balloonist. He complained of his lack of altitude, a difficulty which he feared might eventually defeat his whole work. Remembering the model flights from kites, the Professor asked if it would be practical to launch a large glider from a free balloon Baldwin thought so and plans

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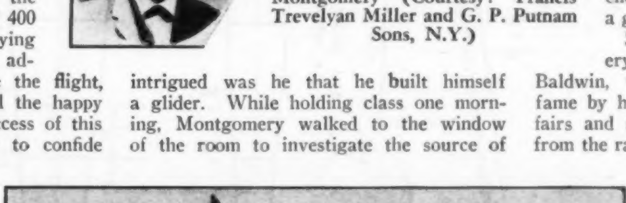
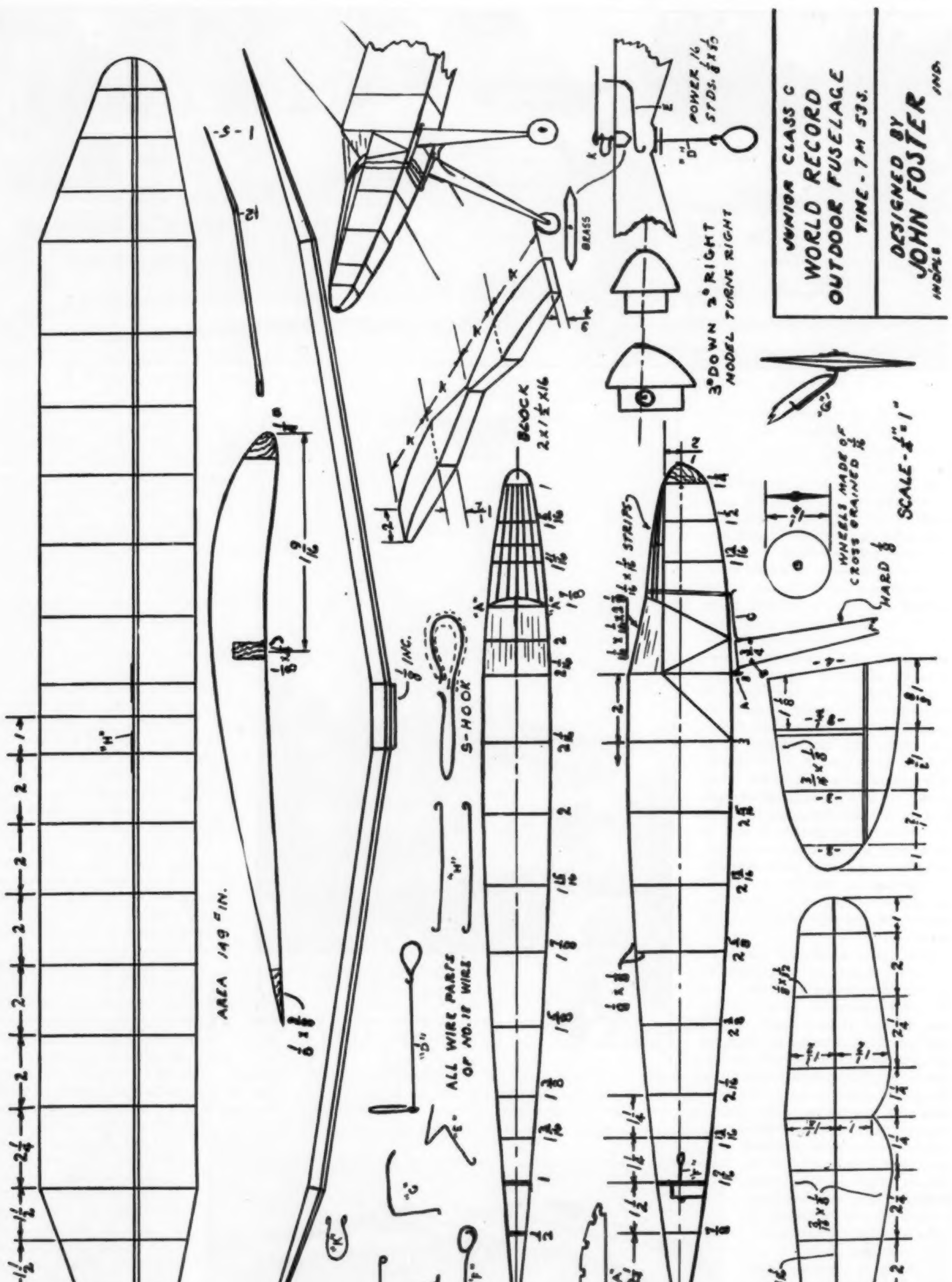


Daniel Maloney in a Montgomery glider (Courtesy of Francis Trevelyan Miller and G. P. Putnam Sons, N.Y.)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OUTDOOR FUSELAGE
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MODEL TURNS RIGHT
SCALE - 1/4" = 1"
WHEELS MADE OF 1/16 CROSS GRAINED
HARD
S-HOOK
ALL WIRE PARTS OF NO. 18 WIRE
AREA 149 □ IN.
BLOCK 2X1 1/2X16
BRASS

By EDWARD L. SEMLER

Author's Note:

The correct procedure to be followed during this contest series was fully explained in three articles printed in the February, March and April issues of the Universal Model Airplane News. It will be necessary for the contestant to have these articles for guidance. If you are unable to locate these issues, write to Model Airplane News, 551 Fifth Avenue, New York City, enclosing (..................) cents, and the copies will be forwarded to you at once.

The instruments you will need: A sharp pencil, an accurate pair of dividers, a protractor. (The protractor will give the degrees of the compass)

Be sure to thoroughly read every detail given in the problems. Write the intervals of time on a separate sheet of paper and, with the information given, find the true course, the speed, and the distance flown in each of these time-intervals. I would suggest that you designate each new position as you go along.

Each NAVI-GOID will be judged as an individual contest. The prizes, consisting of the choice of any $5 (or less) model plane kit advertised in the Model Airplane News, going to the five correct or most nearly correct answers received; in case of tie the entries to be judged on the Post Office Time Stamp. If more than five correct answers are submitted, the five winners will be selected on a basis of neatness of their presentation. The decision of the judges will be final.

NAVI-GOID

The Big Navigation Contest Starts

Try This and Learn to Navigate Your Plane

THE Le Bourget aerodrome had disappeared into the velvety opaqueness, a mere luminous dot marking the battery of brilliant floodlights. Paris glinted beneath the port wing, an intrinsic pattern of tiny, boulevard-strewn lights. Curling in a distorted S, the silvery, irridescent ribbon of the Seine severed the dark city.

The Pratt-Whitney was drumming out its savage challenge to the elements, vibrant with life, . . . a thunderbolt in harness. The Lockheed Vega fought for altitude, its fuselage leaden with the tons of fuel.

Captain Nicholas Carroll was grinning as he eyed the vanishing lights. Arthur Kingsford, co-pilot, nodded happily. "We're off, Nicky," he asserted, "Six months . . . but it was worth it."

Jimmy Lanard was conducting a monotonous conversation with the microphone and they lapsed into silence.

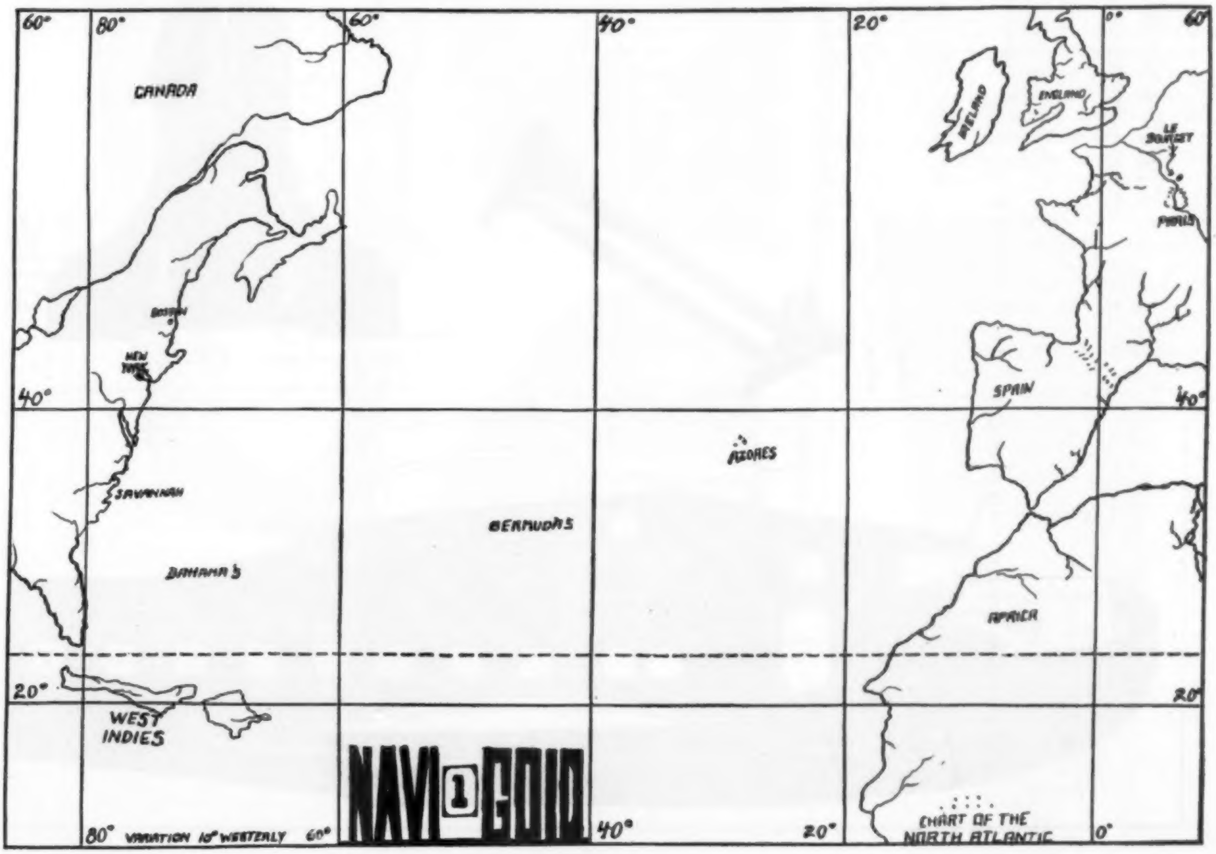
"*Vega Trans-atlantic* calling WRVT . . . *Vega Trans-atlantic* calling WRVT . . . standing by."

The navigator cut into his receiving tubes. The answer came quickly. The station was anxiously alert. "WRVT standing by . . . go ahead."

Lanard nodded to the pilots, then to the mike: "Take-off successful despite drizzle, rain and mud . . . departed Le Bourget 11:15 P.M. . . . Airspeed 110 m.p.h. . . . compass reading 260° (10 degrees S. of West) . . . altitude two thousand. Come in."

"Fine work, Jimmy. Keep it up. I

(Continued on page 36)



The completed model is a fine glider and a thing of beauty

Build and Fly the China Clipper Glider

How to Create a Fascinating Flying Silhouette Model of the Trans-oceanic Clippers From Sheet Balsa Wood

By JESSE DAVIDSON

THE clipper ships of the middle 19th century were the fastest sailing vessels ever built and were used extensively in the California and Australia gold rushes and in the tea, opium and slave trades. They were the last effort to compete evenly with the steam vessels on long voyages and with heavy cargoes, and for many years they were moderately successful in delaying the final victory of steam.

When Donald McKay's Flying Cloud arrived in San Francisco 89 days out of New York it established a record never surpassed and only twice equalled—once by the Flying Cloud herself three years afterward, and in 1860 by the Andrew Jackson. It was indeed a triumph of which every American at the time had reason to be proud for it reduced by one-quarter the record of 120 days made by the clipper ship Memon two years before.

It was of this event that the New York Commercial on October 8th, 1851, said: "Such a passage as this is more than a local triumph and inures to the reputation not alone of the builders of the ship and her enterprising owners, but of the United States. It is truly a national triumph and points clearly and unmistakably to the preeminence upon the ocean which awaits the United States of America."

At this period of its history, the United States was at the peak of her maritime glory. The American flag rippled from the masts of clippers side by side with the Union Jack of Britain in every important seaport in the world. The rivalry between these two countries was intense but the American merchant marine had the edge. One of our keenest foreign critics of the early nineteenth century, Alexis de Tocqueville, in his famous book "Democracy in America" mentions the fact that our mariners were bold and hardy and possessed of confidence that denied the need for caution and safety that too much were with our British cousins. The American ships were faster than the English so that eventually they had to call for Donald McKay, the foremost American ship builder of his day, to design clippers for the English merchant marine.

Donald McKay and the clipper ship era are synonymous. For his was the genius that influenced the improved type of sailing vessel that put America in the forefront of the maritime powers.

The writer regrets that he cannot further elaborate the notes on this phase of American development of transportation for it was indeed a romantic era. America was having its growing pains and expanding westward rapidly. The gold rush was at its height, settlers were pouring into newly acquired territory that was Texas, Oregon and the states comprising the Mexican Cession. Expansion, development and progress was moving at a fast clip.

And so we leave these precursors of the modern clipper ship era that unlike the previous one is not a last expiring effort to hold its own with the steam vessel—the gigantic greyhounds of today—but that will probably reduce ocean-going commerce to the transportation of freight only and leave the passengers and express to the flying clouds of today.

The reader will be interested in the etymology of the word "clipper," I am sure. It is not very clear but probably obtains its derivation from the verb "clip" which in early times meant, among other things, "to fly" or "run swiftly." The expressions "going at a good clip" or "a fast clip" are familiar to most of us. In fact I have used the latter expression somewhere above. We can reasonably suppose therefore that when craft of this new model were first built which were intended in the argot of the day, to clip over the

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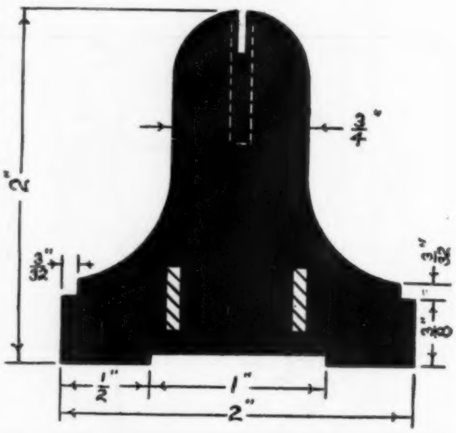

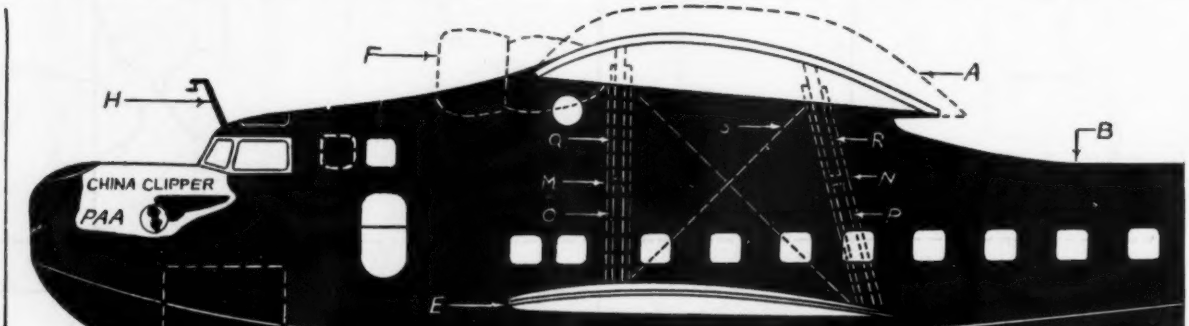

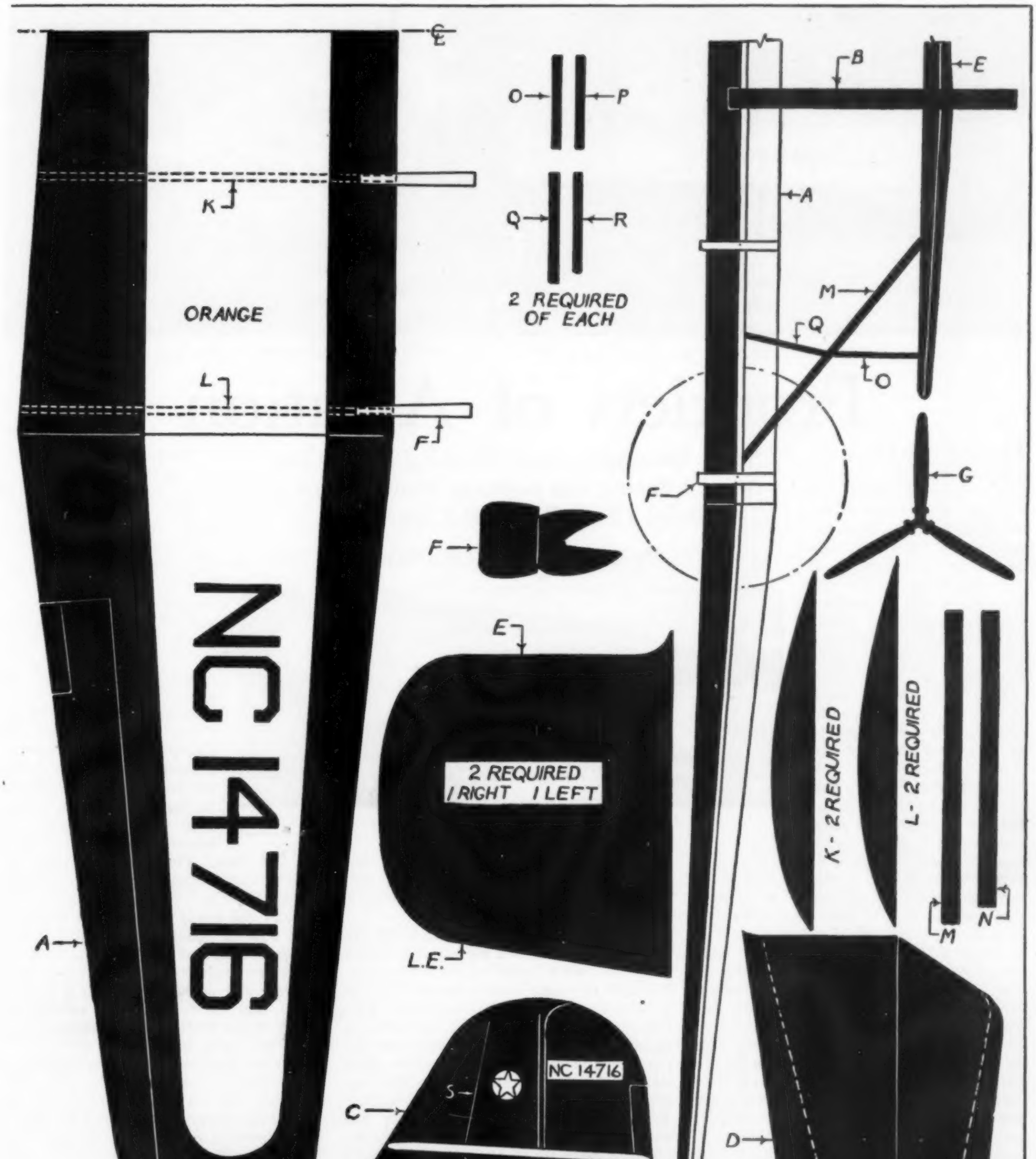
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MARTIN
FLYING BOAT
SCALE 1/8" = 1'

Hayden Campbell of St. Joseph, Mo., and the new Campbell Ford V-8 sportplane of his design

Frontiers of Aviation

Some Interesting New Highlights on Commercial Racing and Fighting Planes—How to Build a Scale Brown B-3 Sportplane

By ROBERT C. MORRISON

HENRY FORD enters aviation once more. After a long period of absence, he has once again come to the fore with a new airplane for the private flier. Though much news of the venture is just beginning to fill the newspapers and magazines, this seemingly recent undertaking of Mr. Ford's is not a new one. In the December 1934 issue of MODEL AIRPLANE NEWS in this series of articles are perhaps the first details ever published of this new plane. It was about the time of the 1934 National Air Races that Henry Ford probably began to lay plans for the new plane, and just two months ago it was completed and given its experimental license by the Bureau of Air Commerce.

The sleek Northrop C-19 Army Headquarters plane

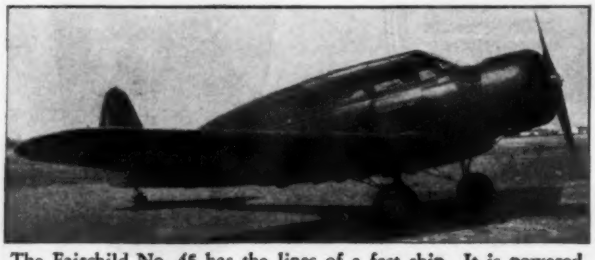
When details of the plane were first considered in 1934, it was rumored that the designers expected to install a Ford V-8 engine in it. It was to be of all-metal construction, and they had hoped to obtain as high as 160 m.p.h., so rumors indicated. The engine was to sell for $250.00, and the entire plane, including engine, for $1,000. How close the designers have kept to these details are not known, and the plane is now cloaked in secrecy at Ford's airplane factory at Detroit. However, the following details of the ship have "leaked out." It is a tailless airplane seating two passengers enclosed in a cabin with dual controls. There is a 60 lb. baggage compartment and two gas tanks holding 30 gal. (fifteen gal. in each tank). Oil capacity is 1½ gal. The small plane averages 17 miles to the gallon of gas with a cruising range of 500 miles.

A standard Ford V-8 engine of 90 hp. that has been intended for use in the ship has been raised to 115 hp. at 4,000 r.p.m. Perhaps this has been accomplished by milling the regular aluminum heads, giving more compression and installing a special cam shaft as was done on the new Ford-powered Campbell sport plane described later in this article. The engine turns a Gardner wooden propeller. Recently a Warner radial engine has been purchased by Ford for testing in the plane. One of the 95 hp. B4 or 125 hp. C4 Menasco engines would be an excellent power plant for the Ford.

The fact that Henry Ford has millions of dollars, a huge airplane factory and airport, and a vast knowledge of mass production principles is sufficient to prove that if Mr. Ford desires to put out a plane at a certain price he can do it—and fill the world with airplanes as he has with automobiles. This makes circumstances interesting and acute.

Many years ago Henry Ford in collaboration with Harry Brooks built two successful small low-priced airplanes. The second unfortunately was lost at sea with Harry Brooks on board. Not until about 1931 did Bill Stout, Ford's new airplane associate, build a small private plane known as the "Sky Car." Unfortunately the public was not ready to purchase planes of that type in quantity, and nothing more has been heard of it. The new 1936 creation has made its appearance just when interest and demand for such a plane is high, and if it performs successfully there is no limit to the success Henry Ford may have with it.

But the idea, that of capturing the aviation industry as he has the automotive industry, has been with Ford for so long that it has seemed to have lost its novelty. From present activities at Detroit it appears that the matter is not being taken seriously enough. The plane as it stands now appears to be only a plaything for



The Fairchild No. 45 has the lines of a fast ship. It is powered with a Jacobs L-4, 225 hp. engine

Here is the new Seversky. Though it is wicked looking, it is only a trainer (A. Noon)

Here is the U.S. Navy high speed Great Lakes Bomber BG-1 for aircraft carriers. Note the cowl flaps (Morrison)

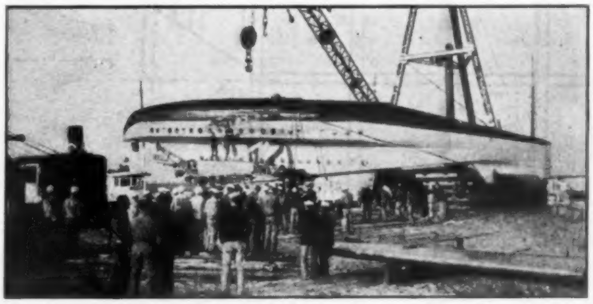
The Grumman F3F-1 U.S. Navy Fighter with a Wasp of 650 h.p. The body is longer than the F2F-1 (Joerns)

the few Ford employees who have been working on it. Activity should be stimulated, and new life be put into the venture. It would be a great thing for aviation all over the world for Ford to go ahead with the enterprise with more forceful steps than appears to be the case at Detroit now. We should watch this development with interest.

The new Campbell private plane that has just made its appearance is about the fourteenth important small low-priced airplane that has been designed since the Bureau of Air Commerce's cry for a $700 airplane. This new plane is very interesting and has very good lines. One of its outstanding features is its unusually good visibility. Its general lines were shown in a picture published in our May issue and in the photo of the plane with this article. The Campbell sportplane is an all-metal pusher monoplane powered by a Ford V-8 engine of 100 hp. at 3,800 r.p.m. It is a flying wing type on which are centrally located the engine, the landing gear, the passenger compartment, and the booms which carry the tail surfaces. Each of these items is attached directly to the wing which effects a material weight saving. The wing weighs one and one-third pounds per square foot which is very light for an all-metal wing.

The Ford V-8 engine is mounted on four regular rubber motor supports directly on the main spar of the wing. It is obvious that the mounting of the engine in this manner is a weight saver over attaching the engine in the nose of the ship. The engine is geared 2 to 1 and supplied with a 30 inch extension shaft integral with the engine attaching where the transmission is usually bolted. The purpose of the extension is to allow the propeller to swing at the trailing edge of the center section of the wing where the body of the airplane is small in dimensions so that air can flow into the hub of the prop. The radiator, directly aft and above the cabin, is mounted on brackets attached to the engine. The engine may be traded in on the regular Ford plan for about $50.

The plane's three-wheeled landing gear is of the type similar to the ones used on the first Curtiss pushers of 1910.



The remains of the Lieut. de Vaisseau Paris is lifted from Miami waters after it capsized recently (Joerns)

The passenger compartment, monocoque in construction, is mounted directly on the main spar of the wing. The layout of the cabin is similar to that of a standard coupe, the seat being 50 inches in width and well upholstered.

One very interesting feature of construction is that the tail booms are of monocoque construction.

The ship takes off in about 350 to 375 feet, climbs at about 580 feet per minute, cruises at over 100 m.p.h., and has a top speed of almost 120 m.p.h. There are no spinning tendencies, and the ship practically lands itself at 45 m.p.h. Cross and down wind landings may be made with ease and safety. The price of the plane will be less than $2,000.

From Buffalo, New York, word comes to us that a plane is under development with no movable controls except perhaps the rudder. The up and down movements of the plane are to be controlled by throttling the engine at certain points. It would be just too bad if the plane cut out while it was in the air. However, the few reports that have been circulated about the plane have been quite favorable. We shall try to bring you more definite details at a later date.

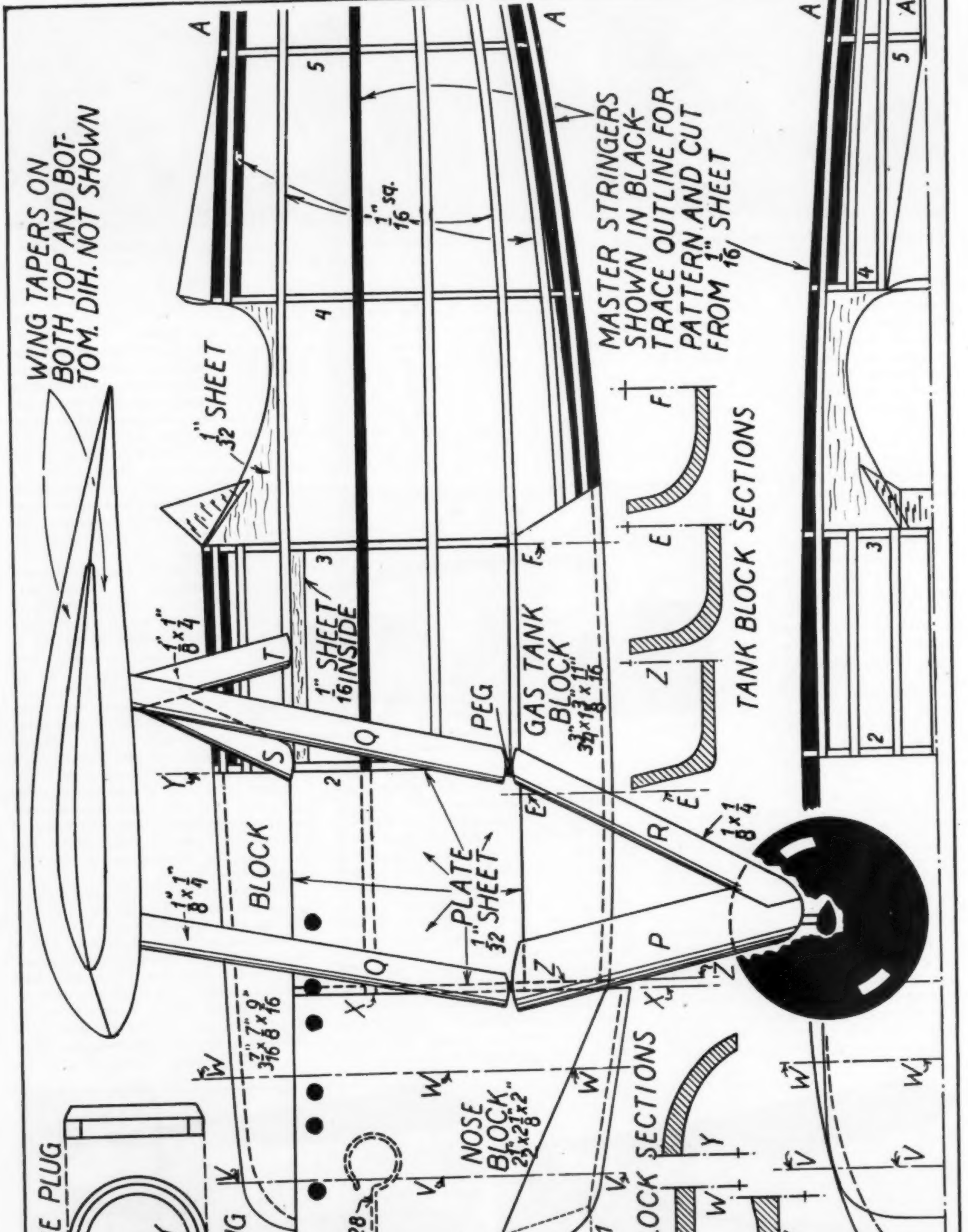
Out in Pasadena, California, an inventor has built a very successful working model of an airliner which will rise vertically, fly forward and backward at various speeds and altitudes. It is known as the "Humming Bird" because of its humming bird characteristics. A company is now being formed with a capital of one million dollars to manufacture the first full-size plane. The proposed ship is of the gyroplane principile with two sets of rotor blades operating in opposite directions. Direction is obtained by tilting the rotor shafts. Officials of the company wish to keep further details secret.

The new $500,000 Curtiss sub-stratosphere transport will weigh about 25 tons fully loaded. It will have a wingspread of 140 feet, a length of 95 feet, and a height of 16 feet. As far as this writer has been informed this is the only plane now being built for the sub-stratosphere. However many others, especially of the military type, may be secretly under construction. Howard Hughes has been

(Continued on page 45)

The Davis D1-W De Luxe sportplane powered with a Warner Super-Scarab 145 hp. engine (Tenety)

An experimental U.S. Army Douglas Observation plane with sweptback upper wing, tested in 1935 (Morrison)



WING TAPERS ON BOTH TOP AND BOT-TOM. DIH. NOT SHOWN
1/32" SHEET
MASTER STRINGERS SHOWN IN BLACK-TRACE OUTLINE FOR PATTERN AND CUT FROM 1/16" SHEET
1/16" sq.
TANK BLOCK SECTIONS
GAS TANK BLOCK
PEG
1/16" SHEET INSIDE
BLOCK
PLATE
1/32" SHEET
NOSE BLOCK
TOP BLOCK SECTIONS
NOSE PLUG
KEY
BEARING
.028
MAKE 11

Large tail surfaces give it unusual stability

Detail gives it a realistic appearance

Building the Flying Scale Dewoitine D-535

Complete Data from Which You Can Create a Remarkable Flying Reproduction of a Modern French Fighter

By WILLIAM WINTER

THE Dewoitine D-535, the latest and most sensational of the French fighters, has been developed from the earlier and equally famous fighter parasol of a few years ago.

The power plant is the renowned 500 hp. supercharged Hispano-Suiza. The wing is of cantilever construction tapering both in plan and in form. It is interesting to note that the taper begins at a point over one third the distance to the tip.

This ship can do far in excess of 200 m.p.h. and is capable of climbing 30,000 ft. or more.

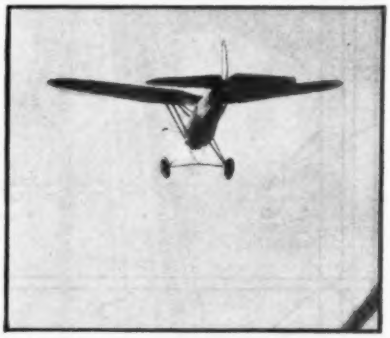
The model is a faithful reproduction of the large ship and because of the parasol design together with many other favorable features that lend themselves favorably to the model, proves to be an exceptional flyer. The finished model not only is pleasing in appearance but affords full satisfaction through the remarkable flights it is sure to make.

Fuselage

The type of construction employed calls for the use of four master stringers. These master stringers are cut from 1/16" sheet balsa. The patterns for them are obtained by tracing the top, side and bottom outlines of the fuselage.

After cutting the master stringers to their required form mark on them the positions of the bulkheads. The bulkheads are also cut from 1/16" sheet. Cement the two side master stringers in place on three of the widest bulkheads. As soon as the cement has set, place the remaining bulkheads in position. The top and bottom master stringers are now glued in place. The auxiliary stringers are 1/16" sq. slightly sanded. They are assembled as required by the plans. The rear hook of .028 wire is bent to shape and imbedded in a rudder post of ⅛"x¼". The cockpit is formed by bending 1/32" sheet. The sheet is cemented in position and allowed to dry before the cockpit outline is cut.

At the nose of the ship there are three blocks; the upper nose block, the nose block proper and the gas tank block. All of these blocks are first cut to the outside required dimensions from soft balsa. The several cross sections necessary for their shaping are given on the plan. The blocks once shaped are roughly hollowed out as shown by the broken lines on the plan. If you find it difficult to hollow them down as far as required, hollow the more accessible portions to about 3/16" thickness leaving the corners thicker. Assemble the finished blocks as shown on the side view. The tank block is not supposed to match the contour of the fuselage perfectly but curves abruptly at the rear to meet the stringers.



In full flight, its steadiness and appearance is unexcelled

The stabilizer fillet block, the size of which is given on the plan, is cut to match the continuation of the fuselage lines. One section is shown on the plan to assist this operation. Note that each side of this block is carved to match the cross section of the stabilizer half.

The section of the fuselage frame between numbers 1 and 2 bulkheads, and between the top nose block and the gas tank block is covered with 1/32" sheet. In making the original cement was rubbed over the entire nose assembly, allowed to dry, and then sanded so that the wood would present a good finish for painting. A piece of 1/16" sheet is inserted beneath the stringer that supports the rear center section strut as shown on the side view.

To cover the fuselage, use narrow strips of Jap tissue cut to a width required by the particular curve to be covered. The finished covering is evenly sprayed and doped.

The windshield is of celluloid and is cemented in the position shown on both the top and side views. The headrest is cut to the required size seen on both top and side views, and cemented in position.

The finished fuselage is painted silver. The edges of the cockpit are trimmed black. Bronzing liquid and silver powder are suggested if a neat job is to be done.

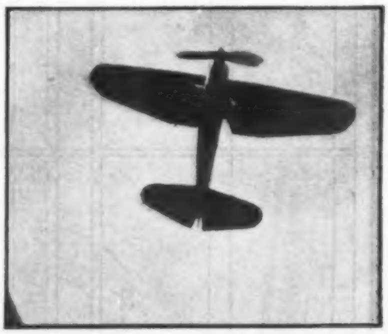
Tail Surfaces

The main spars of both stabilizer and rudder are 1/16"x3/16". The cross pieces are cut to size from 1/32"x3/16". The curved portions are 1/16" sq. bamboo bent around a candle flame to the desired curve. The scalloped portions of the trailing edges of both surfaces are cut from 1/16" hard sheet balsa. The scallops are made with fine sandpaper. Note that the first cross piece of both stabilizer halves and the rudder is also 1/16"x3/16" to prevent "pulling."

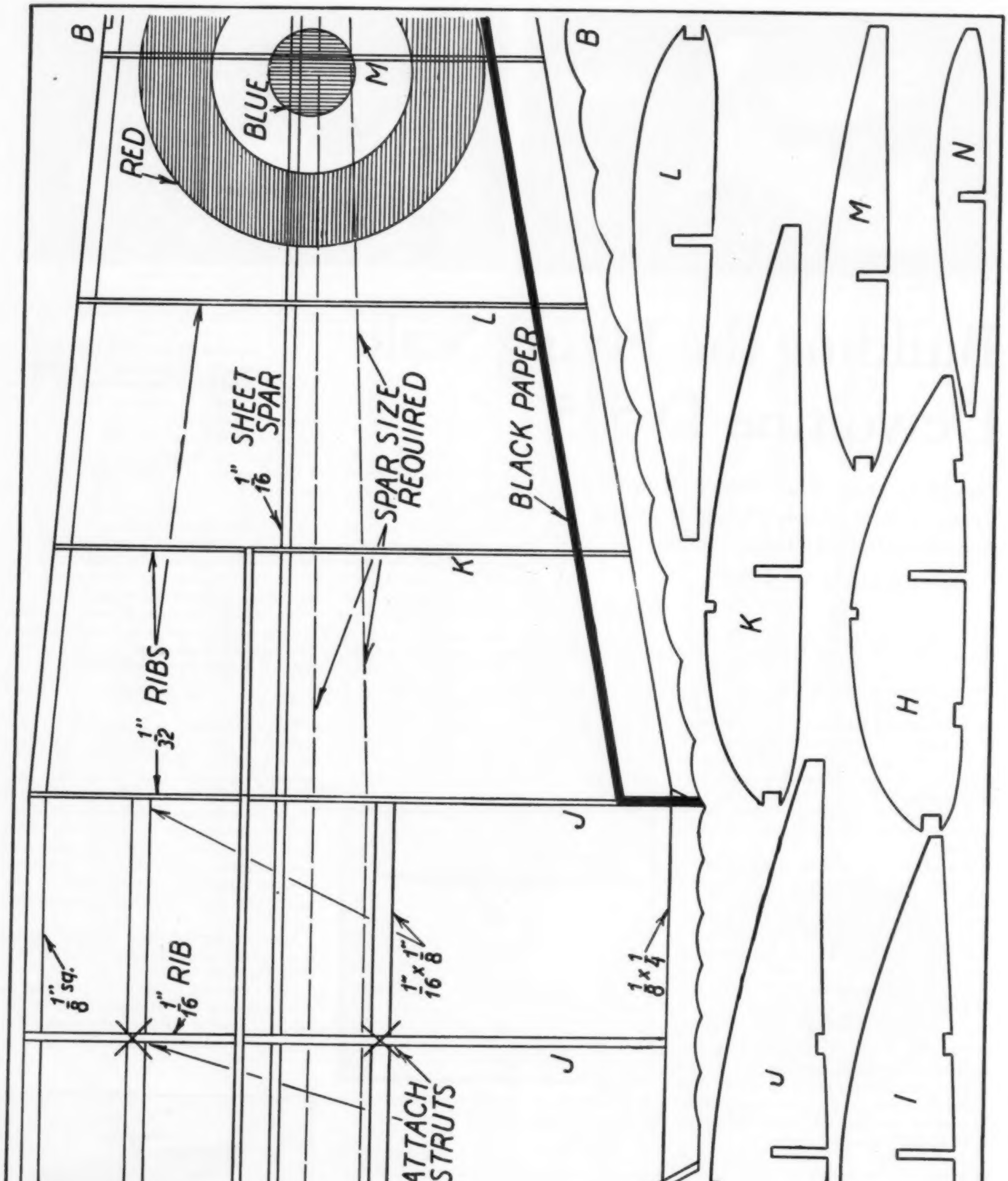
Use one piece of tissue for each side of each surface unit. Doping is sufficient to draw the covering taut.

The completed tail unit is assembled to the fuselage. Use thickened cement for this operation to facilitate the work. The

(Continued on page 44)



The model snapped while flying overhead shows its proportions well


B
RED
BLUE
M
L
$\frac{1}{16}$" SHEET SPAR
SPAR SIZE REQUIRED
BLACK PAPER
K
$\frac{1}{32}$" RIBS
J
$\frac{1}{8}$" sq.
$\frac{1}{16}$" RIB
$\frac{1}{16}$" x $\frac{1}{8}$"
$\frac{1}{8}$ x $\frac{1}{4}$
ATTACH STRUTS
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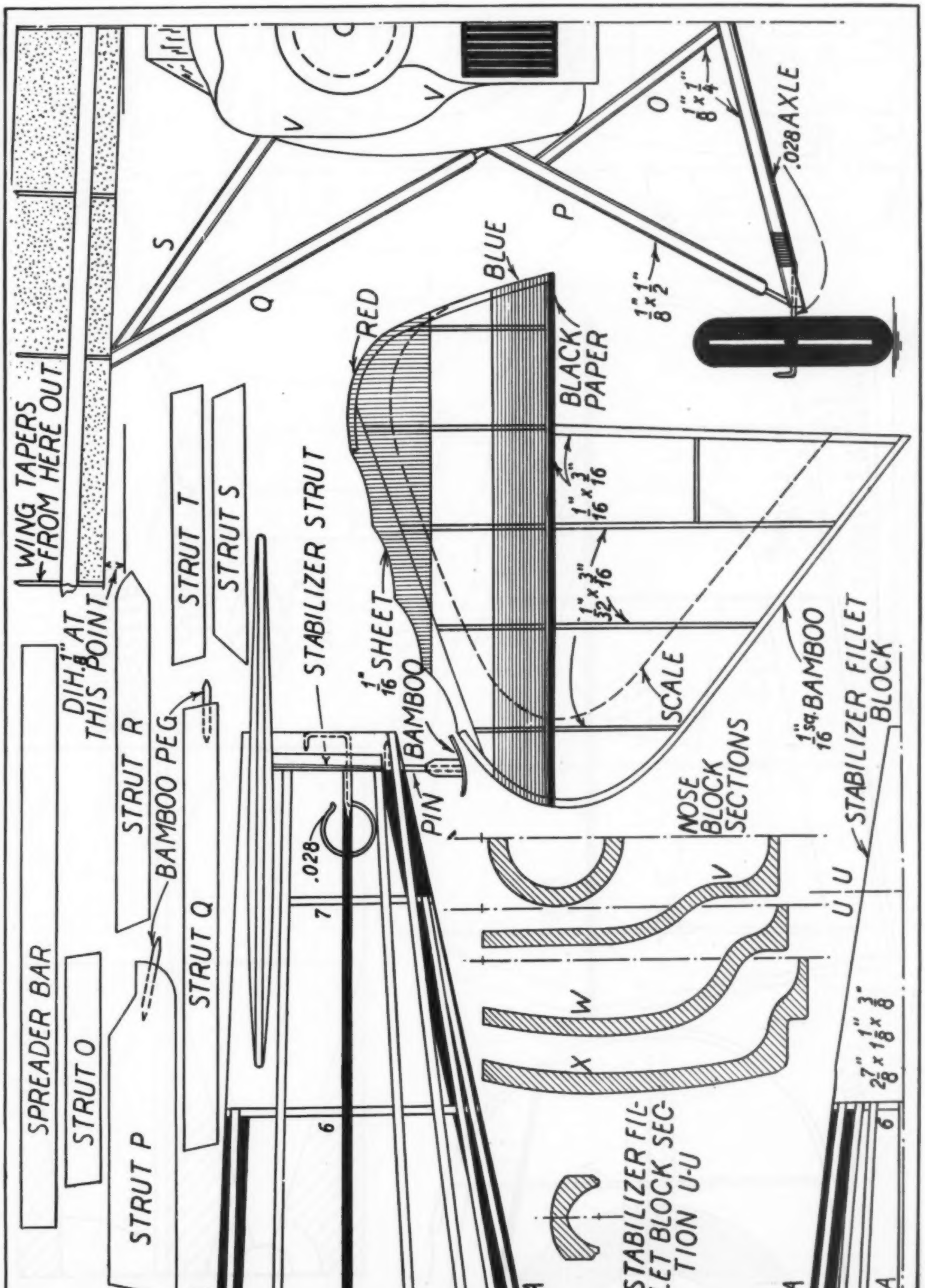
WING TAPERS FROM HERE OUT
DIH. 1/8" AT THIS POINT
SPREADER BAR
STRUT O
STRUT P
STRUT Q
STRUT R
STRUT T
STRUT S
BAMBOO PEG
STABILIZER STRUT
.028
1/16" SHEET
BAMBOO
PIN
RED
BLUE
BLACK PAPER
1/16" x 3/16"
1/32" x 3/16"
SCALE
BAMBOO
1/16" SQ. BAMBOO
STABILIZER FILLET BLOCK
NOSE BLOCK SECTIONS
V
W
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U U
2 7/8" x 1 1/8" x 3/8"
STABILIZER FILLET BLOCK SECTION U-U
1/8" x 1/2"
1/8" x 1/4"
.028 AXLE
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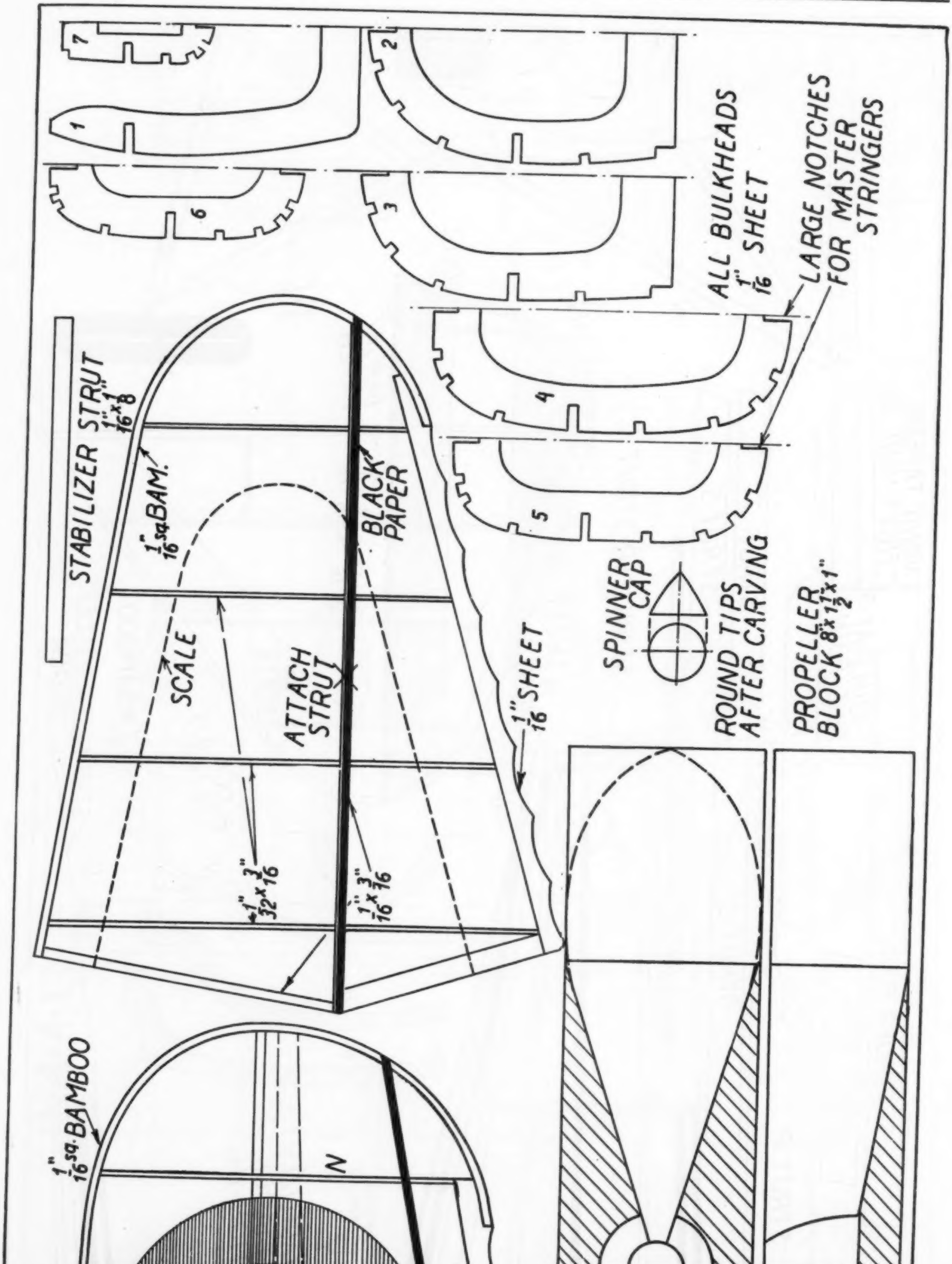

ALL BULKHEADS 1/16" SHEET
LARGE NOTCHES FOR MASTER STRINGERS
STABILIZER STRUT 1/16" x 1/8"
1/16" sq. BAM.
BLACK PAPER
SCALE
ATTACH STRUT
1/32" x 3/16"
1/16" x 3/16"
1/16" SHEET
SPINNER CAP
ROUND TIPS AFTER CARVING
PROPELLER BLOCK 8" x 1 1/2" x 1"
1/16" sq. BAMBOO
N
B
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7

Proportioning Your Model For Stability

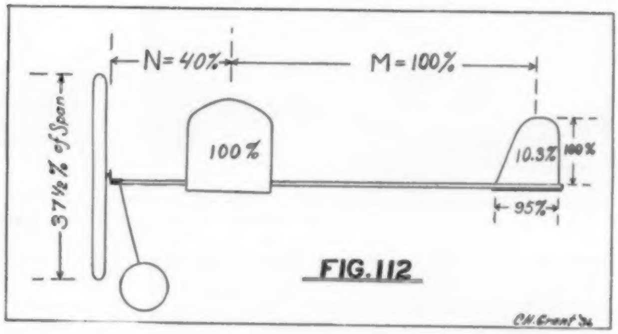


FIG. 112

How You Can Determine the Correct Propeller Blade Area As Well As the Proper Area and Proportions of the Fin

Article No. 51

By CHARLES HAMPSON GRANT

Chapter No. 5

IN THE last few articles of this series it was explained how the model designer should proceed when designing a model plane for the sole purpose of stability. First, how the forces which are developed when the model is in flight should be arranged to insure stability. Second, the type of model that would produce this force arrangement most accurately. Third, the best size of model. Fourth, what structural factors are needed and how they should be proportioned and arranged one to the other.

In order to illustrate this procedure of design in a practical way, an actual model has been designed step by step in conjunction with the discussion. So far it has been shown that the proportioning of a model starts with the establishment of its wing span or size. A span of twenty-four inches was selected. Next the size of the wing chord was taken as three inches; (one-eighth the wing span). Then a camber of one-twelfth the chord was decided upon. You will see that each one of these factors is dependent upon the factor preceding it, for its size. In like manner the proportions of the propeller depends on the elements of size of the wing. The propeller diameter was taken at nine inches; between one-third and one-half the value of the wing span. The pitch dependent upon the "prop" diameter, should be slightly less than one and a half times the diameter. A pitch of 12.6 inches was selected. With these wing and propeller proportions it was found that a blade area of about 8.3 square inches would be required in order to insure efficient propeller action and as small an amount of propeller torque as possible. In other words, a model of this type, when the propeller pitch is slightly less than one and a half times the diameter, *should have a propeller the blade area of which is about twelve per cent of the wing area.* When double surface wings are used the blade area need be only *nine per cent* of the total wing area. This same rule follows in the case of biplanes and triplanes, as well as monoplanes.

This rule is one that gives sufficiently accurate results for ninety per cent of the cases that arise, and is recommended to all model designers except those who intend to build models with unusual aerodynamic characteristics and who wish to be super-accurate. For this class of designer, the

Part No. 2

use of the following formula for the determination of blade area is recommended:

$$a_B = \frac{AP^2(1/3+8C)(4+I)(1+U/8.5)}{160(D)\sqrt{(2D)^2+P^2}}.$$

In the formula, (a_B) represents the propeller blade area in square inches; (A) the wing area in square inches; (P) the propeller pitch in inches; (C) the maximum camber or heighth of the upper surface of the airfoil in terms of fractions of the wing chord, as (1/12): (I) the angle of incidence in degrees, measured from the aerodynamic wing chord, passing through the leading and trailing edges of the airfoil; (U) the desired angle of climb in degrees; and (D) the propeller diameter (or length) in inches. When double surface wings are used on the model for which you are computing the propeller blade area (a_B) the quantity (8C) in the formula, should be replaced with the quantity (6C).

(More details concerning this phase of propeller design may be found in article No. 8, chapter No. 2, of this series of articles.)

Now if the numerical value of the model's characteristics are inserted in the formula in place of the symbols which represent them, we have:

$$a_B = \frac{70(12.6)^2[1/3+8(1/2)](4+2.5)(1+\frac{2.5}{8.5})}{160(9)\sqrt{(2\times 9)^2+(12.6)^2}}$$

Simplifying: $a_B = \frac{285{,}000}{31{,}630}$, or $a_B = 9.01$ sq.in.

Thus the formula method indicates that the propeller blades should have 9.01 square inches of area while the simple approximate method, in which the tables are used, specifies a value of 8.3 square inches for the blade area. This is fairly close. However, many readers probably will wonder what causes the difference in the answers derived by the two methods of computation. The difference should be explained easily when it is recognized that the "table" method is based on a constant value of (2) degrees for the angle of incidence without taking into account different values of this factor that you might use, while the formula takes into account any reasonable value that you may care to choose for this quantity. ie: (I). You will note that in the formula the angle of incidence (I) was given a value of (2½) instead of (2). Of the two methods the formula method is most accurate. Incidentally it shows that more blade area should be used if the angle of incidence is increased.

Size of Propeller Block

Another problem is presented now. What should be the dimensions of the block from which the propeller is to be cut? A value of (9) inches has been chosen for the propeller diameter. Thus the block will have a length of (9) inches. The depth and width of the block can be determined by means of following formulae:

$$d = \frac{P\times W}{\pi D}, \text{ and } a_B = \frac{(\sqrt{d^2+w^2})+d}{2}(0.8)D.$$

Solving for (d) first, the values for the propeller pitch and diameter are inserted in the formula. The value of (d) is then determined in terms of (w).

$$d = \frac{12.6w}{\pi 9} = \frac{12.6w}{28.28} = (0.4455)w.$$

Now inserting this value for (d) in the second formula, we have:

$$a_B = \frac{\sqrt{(0.4455w)^2+w^2)}+(0.4455w)}{2}(0.8)9.$$

Inserting the value for (a_B) and simplifying,

$$9 = [(1.093w)+0.4455w]3.6$$

$$\text{or } w = \frac{9}{(1.538)3.6}, \text{ or } w = 1.62$$

or, the width (w) should be 1⅝ inches. The value for (d) now can be found for $d=0.4455w$, or $d=(0.4455)1.62$. Then, $d=0.723$ inches or about 23/32 inches.

Thus the propeller should be cut from a block 9"x1⅝"x23/32". These measurements are much more accurate than the measurements derived from the tables because it is necessary usually to interpolate between two table values to get an approximately correct value. The exact block size cannot be obtained always by such a method.

Stability Factors

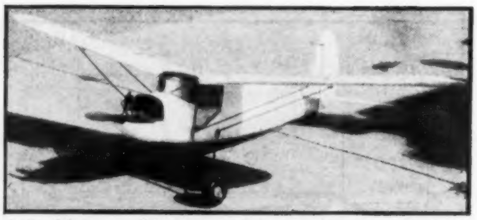
Having established the measurements of the physical features of the model that generate lift and driving force, the next step in the procedure of designing the model is to establish the characteristics of the physical features of the plane that insure its *stability* and promote its general flight equilibrium. Though the combination of antics that disturb the dignity of many flights often appear too complicated to

(Continued on page 40)

"Gas Lines"

A Presentation of Who's Who in Gas Model Airplane Designing, Building and Flying. Tell Others What You Are Doing

International Gas Model Airplane Association News



J. R. Pitzer's cabin gas model. He hopes to fly in it when it grows up. Pict. No. 2

J. B. Oberthier and Fred Hall know how to build scale jobs from the looks of this B./J. Pict. No. 3

Our youngest successful gas model builder Broadus Landrum with the "Corben" he built—not from a kit. (Age 13 years). Pict. No. 4

Here is a very stable "job," the Buccaneer B-5, built by Jack Diamond. Pict. No. 5

One of the few gas jobs that has been built to the exact scale of a large ship; by J. Dykzeul. Pict. No. 7

Laurie Loftin with his Brown powered six foot stick job. He is also building a KG-3. Pict. No. 10

NOW it can be said that the International Gas Model Airplane Association is well on the road to success. This month it has progressed steadily with the enrolling of many new individual members as well as several units throughout the country. Before we tell you the news from the various units and discuss the problems and ideas submitted by gas model fans, we wish to tell you something about the pictures appearing on these pages and ideas received with them from individual members of the Association.

It appears that the greatest amount of activity with gas models is taking place in California. Old and young aviation fans have gone mad over this fascinating activity. We are indebted to Mr. G. H. Gotch of 13600 South Western Avenue, Los Angeles, for considerable interesting information. Mr. Gotch is the manager of the Gotch Airport at Los Angeles and an ardent gas model enthusiast. A club has been recently formed called the Western Model Airplane Association, which is under the supervision of Mr. Gotch, who is the managing director.

Besides the contest which is to be held on June 7th at the airport, one was recently held that proved to be a tremendous success. Sixty-nine entrants registered and sixty-five competed. The landing precision event was exceedingly popular. Four thousand spectators voiced their approval.

Picture No. 1 shows a group of the contestants with their planes. It seems that the western model builders do not favor duration entirely, for in their reply to a card sent out by Mr. Gotch, requesting their information on desirable events, a large percentage favored precision landing within a seven hundred foot circle. This has the distinct advantage of teaching model builders the art of controlled gas model flight. It requires not only that the contestant have the mechanical knowledge to build and operate his plane, but also the judgment to adjust the ship for different types of performances. Seventy per cent of the contestants approved of the duration and precision events, according to the postal card which they sent to the director upon his request. Twenty per cent had minor changes and ten per cent desired fundamental changes or objected to the type of contest.

In the precision event sixty per cent of the models landed within the landing circles, the largest of which was seven hundred feet in diameter. Concentric circles were used in order to figure accurately the distances covered by models in the take off and landing.

We hope to have more news from this active group in our next issue.

Mr. C. L. Bristol forwards a very interesting picture, No. 2, from J. R. Pitzer of Franklin Avenue, Essex, Maryland, which shows his gas model which is an exceedingly neat job. More and more fans are refining the structure of their ships so that now they are beginning to look like the "real thing." This little job has a very neat cabin and detachable engine cowl. Mr. Pitzer neglected to send in information concerning his ship, so you will have to do a little guessing regarding its performance.

We have a picture from Frederick Hall of 1500 West Seventh Street, Plainview, Texas, showing a B/J Army pursuit plane which boasts of a six foot wing span. It is picture No. 3 and was built by Mr. Oberthier. Mr. Hall is building an exact replica of it and has nearly completed it at the present time. Powered with a Forster Brothers ⅕ horsepower engine, the plane was given a few test hops. Hall says:

"We used the method of attaching a small switch to the side of the fuselage with a string on it. It proved very effective but we soon found that it required a good pair of legs to do it. It was easier to fly it against a slight breeze which made it take off quickly and slowed the model down."

An interesting feature of this ship is that it is built to scale and is of the biplane type. Gasoline power has proven a boon to builders who prefer to build scale jobs. The picture speaks well for the quality of workmanship embodied in the model.

Ed Faria and Lyle Jackson with their unique gas model that they built out of "scraps." It flies well. Pict. No. 6

Contestants who took part in a recent "Gas" contest; Gotch Airport, Los Angeles, Cal. Pict. No. 1

Mr. B. M. Snyder writes from 2125 West 54th Street, Los Angeles, Calif., and sends us picture No. 4, which he feels should be very interesting. It shows thirteen year old Broadus Landrum of 1140 West 106th Street, Los Angeles, Calif., with the model which he scaled up from small plans of a Corben and built himself. It was not built from a kit. Landrum is the youngest gas model builder in the country who has come to our attention so far. The wing span of the ship is sixty-six inches and it is powered with the Brown motor.

Bill Effinger, who is the leader of Unit No.5, with headquarters at 53 Berkeley Place, Brooklyn, New York, is building gas models continuously. He sends us picture No. 5 of the Buccaneer B-5 which was built by one of the members of his unit, Jack Diamond of 688 Sackett Street, Brooklyn, New York.

Now we must tell you about two gentlemen to whom we feel we will have to give the "pink tail skid" for ingenuity. We are not speaking in a derisive manner when we refer to them in this way. They have shown more ingenuity than any builders with whom we have come in contact so far. They are Edward Faria of Turlock, Calif., % General Delivery, and Lyle Jackson of 539 East Olive Street, Turlock, Calif. They have sent us picture No. 6, showing their gas job which they have recently completed. This looks like any other gas job, but wait until you hear how it has been built; (to show you what can be done without the use of the most appropriate material). Mr. Faria may be seen in the left of the picture and Mr. Jackson on the right. Mr. Lamar Jackson of 537 East Olive Street, Turlock, Calif., contributed valuable engineering information to the design of the ship. He also lent his Brown motor to the builders so that they might test the job. However, we will let you read what Mr. Jackson writes us concerning it.

"The ship is our own design, which is made up of ideas from a rubber-powered model called the Comet. The adjustment of the wing and stabilizer surfaces was accomplished with the aid of the articles published in Model Airplane News and written by Mr. Grant.

"Our first real test resulted in a truly beautiful flight of ten and a half minutes at an altitude of one thousand feet. This altitude was determined by two aviators who pursued the ship for us. It was my biggest thrill in many years, and I hope it isn't the last. Further adjustments have been made and the ship is now more stable than ever.

"In your January issue there is an article on 'Test Hopping Without Crack-Ups.' We have a much better way to accomplish the same results. You simply attach about twenty feet of light but strong fish cord to the extreme rear point of the fuselage. After the motor is warmed up, you can steer the ship around the field as you please. Head the ship into the breeze and start running behind it with a slack cord. If the ship tends to lift too much on one side or the other, all you need to do is to stop running. We have had our ship in the air dozens of times without any damage whatsoever. Several times I have allowed it to go up between twenty and twenty-five feet only to slow down my running speed and the ship stalls slightly and lands with a perfect three-point landing.

"We tried the idea set forth in the article but the drawbacks were:

1. The ship sometimes turned on the runner and chased him around the field.
2. The ship sometimes continued to glide or roll into some obstruction.
3. Every test hop necessitated starting the motor again.
4. After cutting the motor the ship dived and either broke the propeller or damaged the landing gear.

"I believe that if the gas model builders would use our method described above there would be more builders whose interest would never fade. A concrete example of this is well illustrated in my brother's case.

"He spent two months and considerable money on his ship only to see it break up piece by piece until it is now beyond repair. There is no question in my mind but what he would have obtained some real flights from his ship had he discovered our new idea. There is more to this than the saving of the ship, as we have noted that people who see us with the ship on some field expect to

(Continued on page 28)

Jack Emery's six foot Fokker D-7 gas model. Motor torque demands the use of a large dihedral on biplanes usually. Pict. No. 8

Mel Anderson's stick gas job that weighs only 14½ ounces. The wing span is 46½". It is easy to transport because of its small size. Pict. No. 9

Here's an action picture for you! Capt. C. E. Bowden's low-wing gas job banking on a turn. Yes—"low-wings" will fly. Pict. No. 11

Floyd Field knows how to build stable models. Here is one of them. Pict. No. 12

John Jorgensen's KG-3 before the covering was put on it. Pict. No. 13

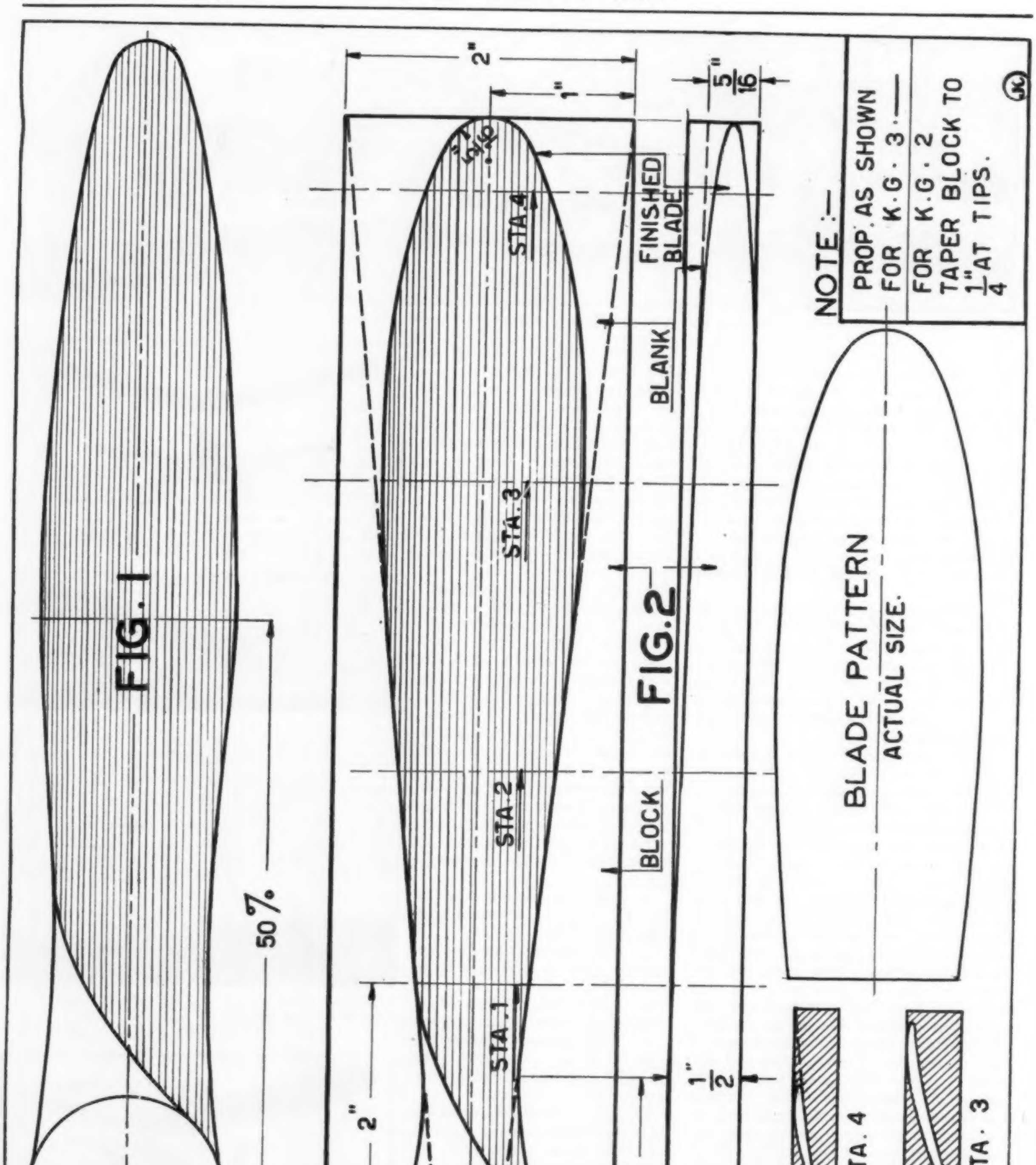


FIG. 1
50%
FIG. 2
2"
1"
5/16"
1/2"
1 3/8"
2"
1 1/16"
1/4"
3/8"
STA. 1
STA. 2
STA. 3
STA. 4
FINISHED BLADE
BLANK
BLOCK
NOTE:—
PROP. AS SHOWN FOR K·G·3 ——
FOR K.G.2 TAPER BLOCK TO 1/4" AT TIPS.
BLADE PATTERN
ACTUAL SIZE.
STA. 1
STA. 2.
STA. 3
STA. 4

"PROPS" for Your Gas Job

How to Make Efficient Propellers for Your Gas Models and Eliminate Troubles That Often Develop

By JOSEPH KOVEL

THE propeller is undoubtedly one of the most important parts in a gas model, as it has a direct influence on the performance of both the engine and the ship as a whole. A propeller that is correctly designed for a given model will tend to make the operation of that model a simple job, while the ship equipped with an inefficient prop frequently makes its owner wish he'd taken up ping-pong instead.

At some of the meets you've attended, you've probably noticed fellows who spin over the prop, run back of the engine and start adjusting the needle-valve, providing the motor is still running by the time they can get to the needle-valve. In many cases, the engine will start up fast, then cut out suddenly. When it does run for a while, its operator will gradually turn down the needle-valve, hoping to get the motor to rev up. It will speed up to a certain point, then stop abruptly, despite the fact that the baffled owner has opened up the needle-valve just as he heard the engine cut. In the large majority of cases, the cause of this "engine trouble" is a prop that is too light!

On other occasions, you've probably seen ships take a long run, finally manage to struggle into the air, then stagger around without being able to get up very high. This may be due to insufficient prop area or diameter, or possibly to the inefficient blade shape of the prop. In regard to the latter, the writer knows whereof he speaks, for he had that trouble at the 1934 "Nationals" at Akron, Ohio. On its first official flight, at that meet, the K.G. 2 was equipped with the prop shown in Fig. 1. (You'll notice that the hub was rather wide, and the maximum width of the blade was at the 50% station. When spinning over rapidly and moving in a forward direction, the prop generated a large surface of resisting disc area, thus detracting from the efficiency of the thrust created by the rest of the prop. The ship required such a long run that it crashed into a car parked at about 150 ft. from the start of the take-off, washing out the propeller and landing gear. On its second attempt, the ship behaved much better as propeller No. 2 (originally exactly the same as the first prop) was trimmed here and there so as to eliminate the resisting portions of the blades.)

Following are some of the more common propeller faults and their effect on the power plant and ship.

When the *prop diameter* is *too small,* and there is an *insufficient amount of blade area*—the engine will have to be run at high speeds in order to get any results. There is a greater amount of wear on the engine when it is turning over very fast than when it runs at normal speed, and there is a tendency for it to use an excessive amount of fuel—an important fact to remember if you intend entering contests. Insufficient blade area requires the ship to make a long run before it can take off. If and when the ship does take off, it will act rather sluggish in the air and climb rather slowly.

Prop too light. This condition may be due to several reasons. The prop may be too small, the wood itself may be rather light, or the blades may be too thin. An engine with this sort of prop has to keep running at a good clip. It hasn't enough fly-wheel action at slow speeds to turn the piston against compression fast enough to supply the spark-plug with enough charges to keep sparking all the while. As soon as the plug should miss firing for one stroke, the engine would stop running. If, during the course of a flight, the ship should attempt to climb steeply, and so put a strain on the motor, slowing it down, this lack of fly-wheel action will cause it to quit. How often has this happened to you during an official flight shortly after the ship has taken to the air?

A good test for determining whether or not a prop is too light is to allow the engine to run at its normal speed, shut the ignition switch off for an instant, then snap it on again. If the engine starts up and resumes its former speed, the prop is all right as far as weight is concerned. Another test is to see how slow you can get the motor to turn over. If you can get it to idle steadily at a low speed, so that it barely seems to tick over, you needn't worry about the weight of that prop.

The prop that is too light, in many cases, is also too weak. Have you ever had the pleasant (?) sensation of having a prop blade whiz past your ear? The writer once turned over a pine prop, the engine back-fired, and the aforementioned blade went on its unscheduled and totally unexpected journey. The only time it is desirable to have a weak prop is when the ship is headed for a crack-up. In that case, the prop would break if it should hit anything, thus absorbing some of the shock and minimizing the damage that might occur to the motor. The writer has seen ships take off with a nice aluminum or laminated prop, dive into the ground or fly into some obstruction with the engine running, with the result that the prop shaft of the unfortunate engine looked like a pretzel, just because the prop refused to break at the crucial moment.

An *unbalanced prop* causes the engine and ship to vibrate excessively, inviting structural failures in the ship and frequently crystallizing the ignition wires of the motor, causing them to break, and so stop the engine. This vibration also tends to change the needle-valve setting of the motor, causing the engine to slow down, or to stop entirely.

Prop doesn't track. This may be due to incorrect laying out or cutting out of the prop blank, the shape of the blades not exactly alike, prop not statically balanced, or if balanced, cross-section of the blades is not the same at corresponding stations. Another possible cause of this condition might be the difference of grain in each blade. Those of you who have carved balsa props have frequently come across this condition—props having a light blade and a heavy blade. The chief effect of the prop that doesn't track is its loss of aerodynamic efficiency. If you've had occasion to witness an indoor meet, you've probably noticed some ship appearing to limp along, either due to an unbalanced prop or because a rubber knot caught on the prop shaft, preventing the prop from tracking properly. This ship, as a rule, doesn't behave nearly as well as the ship that has a perfectly balanced and tracking prop.

An efficient gas prop should have the following characteristics: Proper aerodynamic design (correct pitch, blade shape, sufficient blade area and proper cross-section of blade); suitable material (moderately heavy, strong—yet not too strong), static balance, perfect tracking, and a good finish.

Let's get together and go through the operations of carving a prop. The one shown in Fig. 2 has already proven its worth, as it was with an almost exactly similar prop that the K.G.2 established the new limited fuel record last summer at Hadley Field, N.J. The only difference is that the K.G.2 block tapered to ¼" at the tips. The prop in Fig. 2, after considerable experimenting, is now recommended for use on the K.G.3, or any similar ship. It was designed for a ship having a wing area of about 10 sq. ft., a wing loading of approximately 6/10 lbs. per sq. ft., and is to be mounted on a 1/5 hp. motor turning over at a normal or cruising speed of 3500 r.p.m. The prop has a theoretical pitch of slightly over 8", and, after allowing for slip, should pull the ship along at about 23 m.p.h. Notice that the area of the blade at the hub is small compared with the prop shown in Fig. 1, and that the maximum width of the blade is at the 67% station.

Having decided on the pitch and design of the prop, the next step is to decide what material to use. The writer is rather partial to bass wood, as it is moderately heavy, strong enough to take the ordinary knocks in the life of a gas prop (including engine back-fire), yet weak enough to break in the event of a crack-up. Last but not least, it is a wood comparatively easy to work. Other woods suitable for props are hickory, mahogany, lemon-wood and ash. Avoid using pine, as it is too light and too weak.

(Continued on page 34)

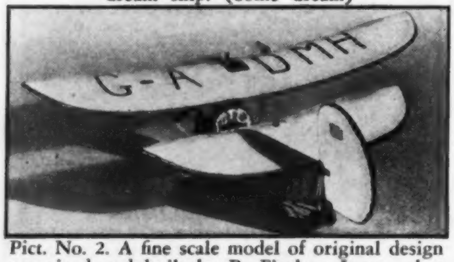
AIR WAYS
HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments

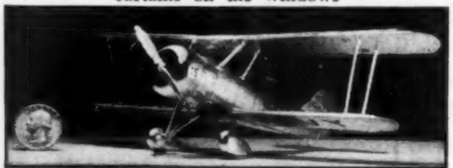
The Percival Mew Gull, by K. Dabzell

AIR WAYS CLUB NEWS

Pict. No. 1. An exact scale model of J. Kohot's dream ship. (Some dream)



Pict. No. 2. A fine scale model of original design conceived and built by R. Fincher. It even has curtains on the windows



Pict. No. 3. One of the best midget scale models we have seen. By H. Clark

Pict. No. 4. This Boeing F4B-4 built by Fred Elliott is complete in detail

AIR WAYS readers will be interested to know that the Air Ways Club has grown considerably since publication of our last issue. At the present time there are members in nearly every state in the Union. Most of these are individual members rather than units. However, it is expected that several large groups will join the club. In a coming issue we will have an interesting surprise which will stimulate activity among all Air Ways Club members. At present a small pamphlet is being written in order to give all club members an idea of the purpose of the club; its laws, contest rules and suggestions for unit activities and acquiring new members.

In the past pictures published in Air Ways have been sent in from boys throughout the country not affiliated with the Air Ways Club. However, in the future this column will be devoted chiefly to activities of club members. They will be given publication preference.

Our heading this month is unusual inasmuch as it comes from London, England. The drawing was made by K. Dabzell of Room 3, Fourth Floor, Fairfax House, Fulwood Place, High Holborn, London W.C.I. Mr. Dabzell lives in the section of London known as "Gravesend," on the River Thames, where there is an airport. (Rather a curious name to be connected with an airport. We trust that it has no ill effect upon its business). The Percival "Gulls" are built near here and Mr. Dabzell has been fortunate enough to pass through the factory where he has seen planes in various stages of construction. It was this contact which prompted him to make the drawing of the "Mew Gull" and send it to us. He is extremely interested in having readers write to him and exchange ideas, especially those interested in aviation art.

It appears that originality has not yet been murdered by our tendency to over-organize and mold everyone to the same pattern, for Joseph B. Kohot of 1221 Summit Avenue, Monessen, Pa., has sent us picture No. 1 which is the essence of originality. In fact it is his dream ship of the future. He has taken great pains, as you see in the picture, to build an exact and highly detailed scale model of his idea. He says:

"It has a thirty-six inch wing span and required four hundred hours to complete. I have a lot of fun building models and ships that do not exist. At present I am enjoying building a fighting plane of my own design.

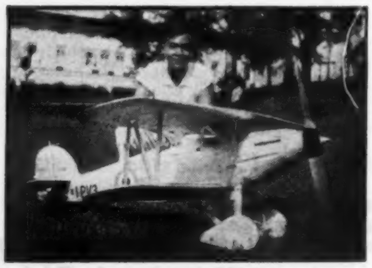
"I would like to correspond with any club members and exchange hints."

Mr. Kohot has been building models for ten years and is an instructor in the local high school for a class of beginners.

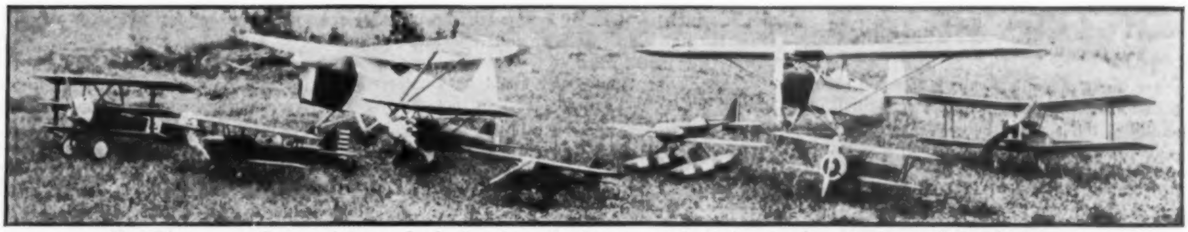
A picture of a very neat scale model has been sent to us by R. Harold Fincher of Louisiana Polytechnic Institute, Ruston, Louisiana. It is picture No. 2. This also is not a scale model of an actual ship, but one which exists purely in Mr. Fincher's imagination. He says it is a combination of the Vultee and the Northrop Delta. It has a wingspread of twenty-nine inches. All the details are complete. It has seats for eight passengers and two pilots, full controls and a complete instrument panel in the cockpit

Pict. No. 6. Raymond Halverson has some swell looking planes. Here they are. Note the trim Hawker

Pict. No. 5. An excellent flying job by Bill Kohl, doing its "stuff"



Pict. No. 11. A Hawker scale job nearly full grown. Built by Too Chee Chew of the Malay States



Pict. No. 12. A fleet to be proud of, showing all plane types, built by Gordon Hughes and Frank Furness

and the cabin is fitted with window curtains, a linoleum floor and it has celluloid windows. The door is hinged and can be locked. There is a lavatory in the customary place. (We are sorry that Mr. Fincher has not seen fit to install running water). The motor is made of seventy-four different pieces of balsa, pins, etc.

The photograph of the model was made by John Davis.

Another original "brain-storm" has been sent to us by Henry Clark of 46 Fort Washington Avenue, New York City. This is shown in picture No. 3. It is an eight inch solid scale job which Mr. Clark designates as the "CT-2," "T" standing for trainer. Actually this name is not a misnomer. It appears that Mr. Clark received training in the art of constructing it, rather than flying it. Close examination of the picture will reveal a quarter which stands on edge to the left of the model. It gives a very good idea of the comparative size of the ship. Considering its diminutive size, the workmanship is exceedingly fine.

Now we have a contribution of a model built to the exact scale of the large ship. It is a Boeing F4B-4, built by Fred Elliott of 526 Hyde Avenue, Ridgeway, Pa., and is shown in picture No. 4. Elliott says that he did not spend much time on it, only about three weeks, but we think it is very nearly complete in detail, with valves in the tires and a complete motor of over a hundred twenty-five pieces. Even the pilot is equipped with goggles with glass lenses. The ship is fifteen inches long and is a flying as well as a scale model.

Many model fans have difficulty in taking photographs of pictures in flight. It appears that it is not a simple matter of starting the model and snapping the shutter in order to get the flight pictures. Several conditions must exist.

First of all, a model must be exceedingly steady and a stable flier.

Second, the flier must be able to control the flight of the model within certain limits so that the model will fly over a predetermined course.

Third, the photographer must understand the value of a correctly posed picture; the degree of exposure to give for the amount of light present when the picture is taken.

And lastly, he must take the picture at a moment when the model is framed properly on the plate. This last requirement is a tricky procedure.

It appears that Bill Kohl of 3536 Victor Street, St. Louis, Missouri, has mastered most of these qualifications, for he has sent us picture No. 5, which he has taken of his plane in flight. It is an exceedingly good picture. The ship has an eighteen inch wing span. It has an eight inch prop powered with two strands of one-eighth inch flat rubber.

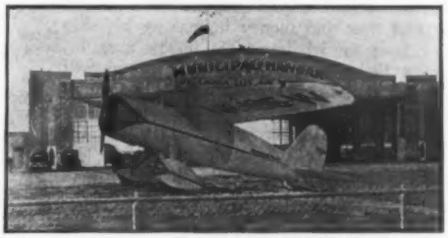
It appears that Raymond Halverson of Watertown, Minn., runs to quantity as well as quality, in respect to his models. He also knows how to take pictures, for he has sent us a fine picture, No. 6, of a group of his ships. All of them are exceedingly well made. The group includes a Hawker Super Fury, Curtiss Goshawk, Douglas Flying Cloud, and several others. The Curtiss Goshawk is a complete scale model with all details included. Some of the details are: machine-guns, machine-gun sight, instrument board, movable controls, carburator air scoop, shell ejectors and the correct insignia. He tells us that he has built over twenty models during the past three years.

Several solid models which he has made have been painted with Cook's Rapidry Enamel, which gives an excellent finish.

The little C-1 Pursuit in the upper right corner of the picture has flown a hundred forty feet hand-wound without a rubber lubricant.

Don't let picture No. 7 fool you. Believe it or not, this is not Wiley Post's Lockheed Vega on the tarmac of an airport, which one may suppose. It is another case of trick photography imposed on the public by a varied group of personalities. It seems that Ed Dickson built the model, Cecil C.

(Continued on page 41)

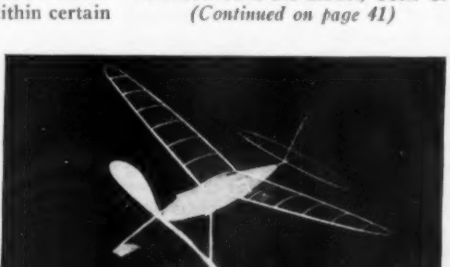


Pict. No. 7. One of the best faked shots we've seen. It's just a model Lockheed by Ed Dickson. (Photo by Cecil Ison)

Pict. No. 8. Here is a real flight picture of Donald Boardman's model functioning at 10° above zero

Pict. No. 9. A super scale "Pou du Ciel" by F. L. Corkett

Pict. No. 10. This SE-5A by Alec Ingram is perfect in detail. The struts are hollow steel tubes



Pict. No. 13. W. B. Mackley's R.O.W. which holds the New Zealand record

Pict. No. 14. Jack Golden and his exact flying scale Monocoupe that made 41 min., 8 sec.

"Gas Lines"

(Continued from page 21)

see a flight of some form. I have on many occasions given these people a real thrill by allowing the ship to leave the ground and pull it back to earth. They, upon seeing this exhibition are satisfied that the ship will fly and therefore are immediately won over by the possibilities of flying model ships as a sport worth while.

"In every community there is always a group that imagine anyone who would spend time and money in making his ship or boat or whatever his hobby may be, is a little queer. This same group will spend dollars and dollars with a camera in hand or with a fish rod likewise. However, the real interesting fact is that the older they are the harder they fall and it has been my experience that the men around forty or forty-five are the ones who will really be our future gas job builders.

"I realize that the biggest factor in the development of interest in gas jobs is the prohibitive costs, and the only thing that will make it really become the sport of young and old is for the manufacturers of engines and wheels to cut down on their prices and for the designers to instruct builders in the art of making something out of nothing. I believe that with our ship we have really made something out of *this* nothing. Our ship is simple yet strong.

"The fuselage is made of common white pine longerons grooved into one-fourth inch pine veneer bulkheads. The tail surfaces have a framework cut from a solid piece of this same veneer and are re-enforced with balsa strips. The wings have two pine longerons with the main lateral strength being supported by birch dowelling. The ribs are of balsa. Eighteen pound fish cord is woven between the ribs for added strength. The landing gear is made of birch dowels and has shock absorbers. The most noteworthy thing about the whole job is the cost of covering the ship. Common store wrapping paper was used at an exact cost of but ten cents. The most costly item was the cement, which by the way cost us too much. The whole ship cost $4.12 to construct. I daresay that we could reproduce it for $2.50 with our present knowledge.

Without a doubt the production and flights of this ship embody the most amazing display of ingenuity of which we have a record. These ideas unquestionably will prove of value to hundreds of builders who cannot afford to pay large prices for material. After all, it seems that all you have to have is brains.

Theodore Dykzeul of Bellflower, Calif., Route 1, Box 278, sends us picture No. 7, which shows his exact scale gas model Stinson. Mr. Dykzeul writes as follows:

"This model has a spruce framework for the fuselage with a balsa super-structure. The wings and tail assembly are all balsa, The landing gear is scale with the exception of an extra wire brace used only for flying. This is shown attached in the picture. Although it is a scale model, it weighs only two pounds, seven ounces, complete with two medium sized batteries installed. It is powered by a Baby Cyclone motor which is more than enough power. Due to its light weight and excessive power, the model flies at a speed of over forty miles per hour, and lands at about fifteen miles per hour. It does not fly the least bit 'tricky'.

"The model now belongs to W. E. 'Bill' Atwood, nationally known model builder and designer of the Baby Cyclone motor."

Here we have another biplane, in picture No. 8. It is a six foot Great Lakes Trainer, built by Larman Jirsa. It was sent to us by Jack deV. Emery, president of the Aviation Advancement Club of 2922 Adams Avenue, San Diego, Calif. This is the club which recently held a large model airplane contest at Camp Kearny Mesa, near San Diego. All the prominent gas model builders on the west coast competed. Mr. Emery comments about his experience with this contest. He says:

"I believe that with proper policing to keep crowds back, flying gas models is safer than many hobbies that young people have, and when there are no crowds the element of danger is negligible. However, if proper policing is not to be had I recommend that no flying be done. I know because while we had State Troopers promised, they did not arrive and the club members were not enough to keep the 1500 people (approximately) back. We had too many close calls that could have easily caused damage to persons and property.

"Recommendations I would make from the results of this contest: ALL cars to be parked at least 800 feet from the starting place, on the *up wind* side of the field. All persons except contestants, two assistants per each, and officials be kept at least five hundred feet *up wind* of the take-off place."

All those who have had experience with gas model contests will know it is well to take Mr. Emery's remarks seriously. Gas models seem to draw crowds more quickly than "sugar will draw flies." All anyone has to do is start one of the little motors popping and a subway rush takes place.

Mel Anderson of 1500 South Fremont Avenue, Alhambra, Calif., is one of the outstanding gas model builders on the west coast. He sends us picture No. 9 showing one of his gas models. It has a spread of 46½", weighs 14½ ounces and is powered with an engine of one-half inch bore. The engine weighs 2½ ounces and the complete engine unit weighs 6½ ounces. Mr. Anderson says:

"I believe this makes an ideal gas model; I don't mean the design but weight and size of 14½ ounces for the model and engine. It can be taken any place and flown in almost any kind of a field."

One of our very ardent members is Mr. Laurie Loftin of Alta Vista, Virginia. He eats, sleeps and lives airplanes from one day to another. He writes and sends us picture No. 10, which shows him with his stick gas job. It has a spread of six feet, nine and a half inches and weighs four pounds. He also has gotten on to the trick of tying a string to the tail skid for test purposes. He says:

"I let it run across the ground and when it is about ready to take off, I stop the string from playing out and the ship, after gaining a little altitude, descends and lands. We let it attain about five feet of altitude."

Loftin says that he has a KG on the way with which he soon hopes to knock off a few of the mountain tops at Mr. Grant's camp in Vermont this summer.

We have a very interesting flight picture, No. 11, which was sent to us by Captain C. E. Bowden of 48 Bunbury Road, Northfield, Birmingham, England. It is one of the best we have seen and embodies plenty of action. He says:

"The model has an eight foot span with a chord of sixteen inches at the root and thirteen inches near the tips. The engine is a special inverted Brown Junior fitted with piston rings and a small float controlled carburetor. The duration of flight is controlled by a flap mechanism."

Capt. Bowden holds the British gas duration record which is, by the way, "out of sight." It was not made with this model, however. He tells us that the model in the picture, although a low wing is very stable and a slow flier.

Floyd J. Field of 1128 West 11th, Emporia, Kansas, writes and tells us of his experiences with his six foot, eight inch, gas job, shown in picture No. 12. He says:

"We have used a Clark Y which has proven very efficient. However, it is just a little fast, letting the plane fly about twenty-two miles per hour, with about 2800 revolutions per minute of the propeller."

At last we have found an honest model builder. This is the lowest speed that any gas model builder has quoted for his ship, so far to our knowledge. Actually, this is the speed at which many model jobs fly, believe it or not. Mr. Field says that he and Lee Irwin built the ship on a fifty-fifty basis. To date they have made seventy-five flights with only three minor crack-ups, which merely broke props and loosened the rigging in the center section. The longest flight has only been five minutes as they do not have any good open places to fly in. The ship has proved exceedingly stable and nearly always lands against the wind. A Kodak timer aids in shutting off the motor at a given time.

John Jorgensen of 20 Glidden Street, Beverly, Mass., writes us and shouts praises for his KG, shown in picture No. 13. He says he has wonderful results in flying both with skiis and wheels. Of course, Mr. Jorgensen is not referring to the ship as it appears in the picture. This was taken to show the framework before it was covered. It weighs five and a half pounds and uses a Brown Junior.

Mr. Jorgensen wishes to know if it is possible to construct a cabin for the KG without any radical changes. We will answer this as many other KG builders may be interested.

In place of the center section make a rigid cabin, streamline it with a general sweep from the trailing edge of the wing to the tail. This rear upper portion of the fuselage may be curved or "Veed" to reduce the weight. A sloping windshield down to the engine cowling balances the cabin, which adds surprising grace to the ship. Good results have been obtained by other builders with these changes.

Bernard J. Sturmok of 1932 Loring

(Continued on page 48)

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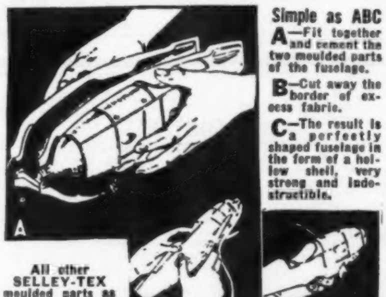

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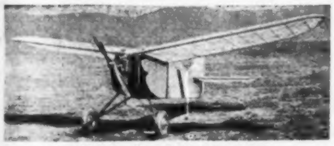
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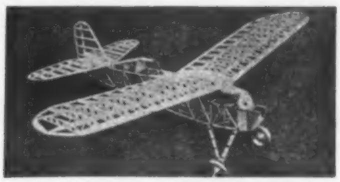
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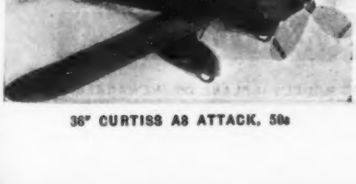
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Build and Fly the China Clipper

(Continued from page 10)

waves rather than plough through them, they became known as clippers because of their speed.

During the War of 1812, the swift privateers built at Baltimore were known as Baltimore Clippers but whether these were the first ships described as such in a nautical application is not certain but undoubtedly the word clipper is of American origin. It is interesting to note that the aerial clipper ships are built in Baltimore where the Martin Aircraft Company is located.

The first Sikorsky and Commodore flying boats to be used by the Pan American Airways in its South American service in 1928 can be compared with the fast little packets that immediately preceded the era of the clipper ship. Today Pan American Airways has the swifter clippers such as the Brazilian Clipper, Pan American Clipper, etc.

With the South American routes established and operating smoothly, Pan American looked out over the Pacific seas and beyond and saw the Philippines, 21 days away by surface vessel, and a little farther on sprawling China. . . .

The newspapers were full of the China Clipper's first regular flight to the Philippines and return. You've read of the ovations; descriptions of the ship. No need to rehash it. Then followed the Philippine Clipper. And today they clip it down the wind to the islands discovered in 1521 by Magellan and where he met his death.

Tomorrow, flying clouds will scuttle over the North Atlantic towards Europe.

And so, reverting to the editorial of the New York Commercial quoted above, its sentiments can be modernized by substituting the words "in the air" for "upon the ocean." But the United States does not await preeminence in the air. It is preeminent.

And now to work. The materials listed below are balsa unless otherwise specified:

A. Wing, 1/16" x 2 1/2" x 16 1/4"
B. Fuselage, 5/8" x 1 13/16" x 11 3/8"
C. Rudder, 1/16" x 1 3/4" x 2 11/16"
D. Elevator (make two), 1/16" x 1 13/16" x 3 1/2"
E. Sponson (make two), 3/16" x 2 3/8" x 2"
F. Motor nacelle (make four), 3/32" x 17/32" x 1"
G. Propeller (make four) 1 1/2" dia.
H. Pitot tube, 1/32" round bamboo
I. Position of the nose weight which is lead foil
K. Wing rib (make two), 1/16" x 9/32" x 2 7/16"
L. Wing rib (make two), 1/16" x 1/4" x 2 9/16"
M. Front wing strut (make two), 1/16" x 1/8" x 2 1/8" bamboo
N. Rear wing strut (make two), 1/16" x 1/8" x 2" bamboo
O. Front lower compression strut (make two), 1/16" x 1/32" x 5/8" bamboo
P. Rear lower compression strut (make two), 1/16" x 1/32" x 5/8" bamboo
Q. Front upper compression strut (make two), 1/16" x 1/32" x 3/4" bamboo
R. Rear upper compression strut (make two), 1/16" x 1/32" x 11/16" bamboo

S. Brace wires which are of white thread.

The principal parts of this glider are the wing, elevator and sponson (shown in half), fuselage, rudder, motor nacelle, wing ribs and struts. Trace all the parts except the struts and propeller on transparent paper or, if you wish to avoid damaging the page, measure each part from the drawing and redraw it on the wood to be used for that part.

The first step is to cut out all the balsa parts exactly on the lines. Now we'll concentrate first on the fuselage. With the aid of a sharp pencil and a ruler, mark out the cabin windows of the hull and also the windows of the pilots' control room. The water line, which is represented on the fuselage drawing by the thin white line at the lower part of the hull, is also marked off on your balsa piece. Be sure both sides of the body are alike.

Before attempting to camber the wing it is best to mark out the ailerons and aileron tabs as well as the area allotted to that portion of the wing to be painted orange. The outlines of the ailerons should also be made on the under surface of the wing. The license numbers are marked off on the upper surface of the right wing and on the under surface of the left wing. The wing is then cambered to shape over a steaming kettle. While so arched, apply cement along the tops of all four wing ribs, letters K and L, and set them in their respective places. The use of small model making pins pushed through the top of the wing part way into each of the ribs will do lots to help retain the cambered shape until the moisture has entirely evaporated. In the meantime you can mark out the hinge lines on both the rudder and elevator parts.

Next to be placed in position are the motor nacelles. Apply a little cement on the cut-away portions of each nacelle and slip onto the wing. Note that the lower part of the cut-away portion of each nacelle fits snugly to each wing rib. See

side view plan of fuselage. Hold the wing away from you and check on the alignment of all four nacelles.

At this time all the main parts of the model are ready for painting. The colors of the Clipper glider are given as follows: The entire fuselage is painted aluminum with the exception of the portion below the water line which is done in black. All the windows shown in white on the plan are done in black on the model with the exception of the large door which should be outlined only, with black india ink. CHINA CLIPPER and the letters P A A as well as the winged globe are done in black. PAN AMERICAN AIRWAYS SYSTEM is also black. Be sure to match both sides alike.

Next, add on the pilot tube. This part is made of rounded bamboo 1/32" diameter and cemented in the position shown on the plan. Paint aluminum. The elevator parts are colored aluminum with the hinge line marked with india ink. The rudder is also aluminum colored and its hinge line and tab marked with india ink. The license numbers are done in black on both its sides.

Now on both sides of the vertical fin nearest to the hinge line paint the Martin trademark. It is a five pointed white star on a circular background of blue. A very fine blue line runs parallel with the angles of the star as close to the edge as possible but leaving sufficient space for a white margin, extremely narrow. Around the blue field is a thin white circle. Above the white circle is a red one five times the thickness of the white one. Around the red circle is a thin white one and over that is still another thin red circle. Inside the star, horizontally, appears the name MARTIN, above, and below U. S. A. in blue.

You are not expected to do all this on the small vertical fin and with the scale-size trade mark shown, but if you're going in for a larger glider of the Clipper and want detail down to the letter, here you are.

The entire wing with the exception of the area designated for orange is painted aluminum. The whole underside of the wing is aluminum. The license numbers both above and below are painted in black. Separate the orange and the silver colors with a thin line of black all around the orange portion. The nacelles are also painted aluminum with a thin black line separating the end of each cowling from the rear portion of the nacelle. See letter F. The sponson halves are painted aluminum.

When the paint on the wing has dried thoroughly, crack the wing slightly at the points shown on the plan by the black and white line just outside the rib position, letter L. The dihedral angle measures ½". If necessary, place little objects at the tip ends of the wing to hold the angle until the cement hardens. Now the model is ready for assembly.

The wing is attached to the fuselage in the position and angle shown on the side view plan. Apply cement along the underside of the wing and press firmly to the body making sure it is perfectly centered. A couple of small model making pins pushed right through the top of the wing

into the body will help hold it securely.

The sponsons may be made individually as listed in the bill of materials, or a piece of wood measuring 1/16"x2⅜"x4" may be cambered to the shape as shown on the side view plan, letter E. Note how it tapers from the inward side which measures 3/16" to the outward tip to measure 3/32". See front view, letter E. Complete the sponson piece with a fine sanding and then with the aid of a thin-bladed knife divide it in half. Check each half by laying it directly on top of the sponson pattern. Attach the halves to their respective sides of the fuselage with a little cement and small model making pins inserted at inward angles to hold them securely until the cement hardens. Afterward remove the pins. Note also that the sponsons protrude slightly ahead of the wing. See side view plan.

In attaching the wing struts, letter M, place them in position first. These are the forward struts. The rear struts, letter N, are next to be cemented in position. The smaller upper and lower compression struts of which two of each are required are then attached as shown on the front view plan. All struts are cut from bamboo and must be streamlined. When the cement has hardened all around, paint the struts in aluminum color.

Before cementing the rudder to the fuselage, attach each elevator half to the sides of the rudder. They are set at a slight angle of incidence as shown by the white line on the rudder drawing. After the cement hardens, attach the whole affair to the fuselage in the position shown on the side view plan. Later add the brace wires of white thread indicated by the letter S between the wing struts (side view) and the tail structure.

Carve out four three-bladed props carefully and twist the blades slightly so that they'll whirl when the model is launched. Use small pins for the shafts and center them into each nacelle. The props, of course, are painted aluminum.

Letter I designates the position for the nose weight. Use lead foil for the weight. Get enough of this foil and fold it into the shape as shown on the plan. Now cut out the portion of the fuselage where the weight is to be placed and cement the foil in with a drop of cement.

Glide the model indoors and out in order to observe its behavior. Should the model stall, add more foil by cementing pieces cut to the same pattern. Add as much as needed until the model glides with a long gradual descent. Touch up the weight of with aluminum paint.

Choose a zreezy day for outdoor gliding and always launch into the wind.

For those desiring to build a model of the Philippine Clipper, the dimensions above given are exactly the same for the sister ship. The license number of the Philippine Clipper is (NC-14715) and the name is placed along the bow as shown in the plans.

Build a Cradle for Your Model

I am sure that you will want to keep this model for decorative purposes and for the best effect, a cradle is the thing. Painted in a yellow and green combination it makes an attractive color scheme in contrast to the aluminum, orange and black trimmings of the glider. It is a very simple affair and can be constructed and assembled in a few minutes.

Two pieces of balsa each measuring 3/32"x2"x2" are used for the ends. An "end" with full size dimensions is shown in the plans from which you can make a full size pattern on stiff paper, cut out, and traced onto the balsa pieces. The front end is distinguished by having the larger slot shown by the dotted lines, while the rear end slot is shown by the white space between the dotted lines. The dimensions of the large slot are ⅛" wide and ¾" deep. The small slot is 1/16" wide and ¼" deep. In each end cut out the right and left slots in which the side members are placed. See letter C in sketch of completed cradle. The slots measure 3/32"x⅜". The slots are placed 13/16" apart measured from the outsides. The length of each side member measures 3/32"x⅜"x7". Apply a little cement to all parts to be joined and assemble as shown in the isometric view. The ends are painted yellow and the side members medium green.

"Props" for Your Gas Job

(Continued from page 23)

Square up the block, determine its center, then, using a drill press if possible, or with a hand drill, carefully drill the prop shaft hole. Fill this hole with a bass wood plug, so that you'll have a place to rest a leg of the compass when you draw the hub circle. Now, lay out the rest of the blank, checking it when finished in order to be sure you've done the job accurately. The next job is to cut out the blank. You may do this with either a bank saw, a jig saw, a scroll saw, a knife, or, if you feel so inclined, you can chew it out. The point is to do the job accurately. If necessary, you can cut to within 1/32" of the line, then sand right to the line, not past it. When that job is done, the next operation is to carve the concave face of the prop, the side facing the tail of the ship. Here again you may do the job in the manner you prefer, using a rasp, knife, draw knife, a sharp piece of glass, or what have you, just so long as you obtain the desired effect. Finish this side with sandpaper, using medium, fine, and very fine paper in the order named. Note that the blade is convex near the hub, flat at the 3½" or 45% station, and concave 1/16" at the tip. Draw a center line along the face of each blade you have just carved, and be sure to get it in the center. Using either a light grade of cardboard, or some soft sheet aluminum or brass (the metals preferred if you intend making more than one prop), make a blade template as per

Fig. 2, by first drawing (or scratching) the base or center line, then determining other reference points and joining them with a smooth curve. Place the template over the blade, taking care that the center lines of both the blade and template coincide, then, using a well-pointed pencil, mark the blade pattern. With a sharp knife, cut each blade to shape, coming close to the pattern line but not quite touching it. Finish shaping the blade with sandpaper. Now you are ready to carve the convex side of each blade.

Whittle away, but be sure to carve both blades exactly the same. Estimate the cross-sections at the different stations as accurately as you can. If you're feeling particularly ambitious, you might make templates for each station, and thus have a positive check on the cross-sections. After the blades are finished, test the static balance of your prop by putting a shaft through the prop shaft hole (you can use the drill with which you bored the hole) and holding the ends of the shaft loosely with the tips of your index fingers. Spin the prop over lightly with one of your other fingers, then notice the manner in which the prop turns over. If it turns over evenly and smoothly, the prop is balanced, but if the motion is jerky, and the prop swings like a pendulum before finally coming to rest, you'll have to lighten the blade which points toward the ground. Scrape or sand this heavy blade, testing the prop frequently for balance, until you are assured that it is just right. Give the prop a light coat of dope, sanding it when dry, and you're ready to give it a test run. Avoid getting any oil on the prop, as it has to be surfaced with paint before it can be called a completed job.

Mount the prop on the engine prop shaft, and start the engine, running it slowly at first. Stand at the side of the motor and see whether or not the prop tracks properly. If it is off track, the chances are that the shaft hole is not perpendicular to the center line of the prop, or the prop blades are not exactly alike. Check both possibilities. If the shaft hole is out of alignment, rebore it. If the blades are not exactly alike, try to make them so by sanding where necessary. Once you get the prop to track properly at low speed, increase the speed of the engine until you have it running wide open. If the prop is off track more than 1/16", determine which is the more rigid of the two blades, then (after stopping the engine and demounting the prop) sand that blade so as to decrease the depth of its cross-section slightly. Test the prop at frequent intervals until it tracks properly at full speed.

The next operation is applying the finish. This serves both to weight the prop and to make it look like the real thing. The paint supplies mentioned below (including the carborundum paper) are obtainable at any reliable auto-supply store, which caters to garages. If possible, use a compressed-air spraying outfit when painting your prop, as it is possible to do a much more workmanlike job with this outfit than when painting the prop with a brush. If you have to apply the paint with a brush however, use long, even strokes. Since you're going to use lacquer paints, remember that the less brushing you have to do, the better the finish will be.

First, apply one coat of lacquer primer surfacer; then, when dry, wet-sand the prop with a fine grade of carborundum paper. Be careful when sanding the edges of the prop, as it is very easy to rub through to the wood. Give the prop two more coats of the primer surfacer, allowing plenty of time for each coat to dry, and wet-sanding each progressive coat with a finer grade of carborundum paper. By the time you have applied and sanded the third coat of surfacer, you'll notice that the prop is velvet-smooth to the touch! Now for the final coats of paint. Get a good grade of clear lacquer and a small package of the finest aluminum powder you can obtain, and mix according to the instructions you receive with the package of aluminum powder. It is preferable to mix your own aluminum paint, as the ready-mixed type usually sold in the stores is lumpy or otherwise unsatisfactory. Give the prop three light coats of aluminum paint, allowing at least one hour for drying between coats. The first coat is wet-sanded with the finest grade of carborundum paper you can get. The second coat is rubbed down with pumice (powdered form), and the last coat is rubbed down with rotten-stone (also powdered form). Allow the prop to dry overnight after applying the last coat of paint; then, as a final touch, "simonize" it. (The finished prop should

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weigh between 1—1⅓ oz.) Now, you can take time out to step back and admire your work.

It may seem like spending a lot of valuable time and going through a lot of needless trouble just to carve a prop that might be broken after a flight or two, depending on the flying qualities of your ship. However, after you've heard some bystander or a fellow contestant tell you what a swell looking "metal" prop you have, you'll feel amply repaid for your investment of time and energy. You'll feel better yet when you notice how much sweeter your engine runs, and what a swell take-off and climb your ship has with the new prop.

Navi Goid

(Continued from page 9)

have the road wide open over here. Lowell is waiting at the Newsbury Mid-City with a Boeing and sufficient fuel to take you to Denver. I've got Arnold at Denver with a Douglas Mono. Here's something for you. The steamship, Lacarno, off the Azores, wired a weather report. Ceiling four thousand, wind pressure low. Standing by."

"That's all. Signing off." He made rapid notations on the pad on the chart table.

A red light winked ahead. International Morse. *"Bon Flighte,"* it spelled. The army ships banked wide . . . then were gone. Below, the sparse lamps of Brest crawled along the black carpet.

Then the strange glitter of the Atlantic, stretching towards the darkened horizon.

Time swept on. The monotonous drone of the Pratt-Whitney had receded to a normal world of sound. The skies grew lighter.

"Steamer to port." The call had come from Carroll, who was peering intently downward.

Lanard knelt on the flooring and opened a trap door. The steamer was angled away from the plane's flight. Visibility was uncertain in the dim light but he could see that there was a marked difference between the ship's wake and its smoke column.

He rose and stepped to his chart table. "Readings," called. Carroll glanced quickly along the panel of dials. "Altitude two thousand . . . airspeed 110 . . . compass 260°."

Lanard entered the figures in his log, then glanced at the chronometer. It read 2:45 A.M.

Kingsford was bent over the transmitter, swapping comments with the steamer wireless operator.

"Stand by for flare," Lanard commanded. He was intent at the funnel-like drift indicator that projected from the fuselage flooring.

There was silence. Carroll had his hand resting on the bomb release.

"Fire!"

The sphere hurtled downwards, swinging to the rear. It struck the surface and began burning brightly as the water penetrated to the calcium phosphide. Carroll banked the Lockheed shallowly, until they were once more behind the flare. Then the Captain pinned the nose on the flare, swinging around until the compass needle read their former course.

"Port," Lanard warned. Carroll edged over. The smoke flare was caught accurately in the drift indicator and the navigator adjusted the plate until it passed directly down the hair-line. In his hand, he held a stop watch. The flare crossed the end zone. Lanard stopped the watch and rose. "O.K." he called. Then he made new notes in his log. Ground speed 105 m.p.h. Drift fifteen degrees North.

"We've only been making 105," he told Carroll. "Better step your airspeed up to 115."

The Captain obediently advanced the throttle. His eyes strayed over the banked dials, seeking a corresponding variation. The rev's and the thermostat responded readily. The oil pressure carried slowly.

Kingsford cut off the transmitter. Lanard pricked the *Vega Trans-atlantic's* present position on the chart and glanced up. "Any news?" he inquired.

"Same thing . . . uncertain weather. Then, of course, they are still laying odds against our chances of reaching the Sierra Nevadas."

"Nothing else?" The Captain's eyes were sharply questioning. Kingsford shrugged his shoulders. "It's coming up the outer edge of the Gulf stream now," he replied.

They lapsed into silence, calculating the possibilities of their evading the brooding "low" area that was crawling up the Atlantic coast. It had been first reported at the flight office at Le Bourget, as a prevailing area, covering some three hundred miles. Since then it had concentrated and traveled North with an ominous determination. And it was in their path.

Lanard's blond head was cupped in his hands. Kingsford stared out a port window, gnawing at his lower lip. The grey mass below seemed to reflect his mood.

"Everything seems to be allied against us," Lanard declared bitterly. "Our contract expiring in one week unless we raise the money for the new equipment. Our test flight crash. The engine failure. Our petrol investors threatening to throw in the towel. Now this storm."

"We've got to reach California," Kingsford murmured, his eyes still locked on the ocean below. "That sixty thousand dollar award is more than enough to supply the necessary equipment. *We've got to reach California.*"

The Captain swung his feet over the edge of the narrow cot and slipped on his fur-lined boots. "I can't sleep," he muttered with tired resignation, "what time is it, Jimmy?"

Lanard lowered his binoculars and glanced at the chronometer. "Nine-thirty," he reported.

"That makes our flight time ten hours and fifteen minutes." He sagged wearily back into the cot, dangling his feet over the edge. "Received any messages yet?"

"No. I had intended sending one as soon as I completed checking up on our position."

"How is the drift?"

"Getting stronger in the last half hour. However, I'm reading it constant at fifteen degrees North from Le Bourget to our present position." Then he called, "Take her up, Art!"

The Lockheed began climbing, boring into the rich blue of the heavens. The brilliant sun flung a glinting shaft of gold into the cabin and Carroll blinked at its intensity. "Trouble?" he inquired.

"No. Kingsford saw a cloud strata above and he wants to test it for a tail wind. It's a lucky break if it's true." He opened the ship's log and began writing. " . . . Drift fifteen degrees north constant. Changing altitudes to intercept tail wind. Weather sharp. . . ." He looked up. "Want something to eat?" he queried. "We finished some time ago. Thought you needed the sleep more than the food, so we didn't call you."

"Thanks."

Lanard's pen continued scratching. ". . . barometer slipping but nothing alarming. . . ."

"Hey, Jimmy!" It was Kingsford.

"Yes?"

"Found the tail wind. I was right. Altimeter reading at six thousand."

"Good. Bear true to the tail wind. What's the compass reading?"

"265°."

"Stand by for flare." Lanard adjusted his drift indicator. "Fire."

Carroll watched the navigator gather his readings as the Lockheed circled and retraced the marked course. "How is it?" he inquired. Lanard checked his watch. "One-sixty," he said. "That tail wind's a gold mine to us."

"What's the groundspeed?" Kingsford wanted to know.

"One hundred and sixty miles per," Lanard told him, "Try and hold it." The navigator slid into the chair at the transmitter panel and threw on the power. Carroll rose and poured a cup of hot chocolate from the thermos. Then he dug a sandwich from the kit and returned to his seat on the cot and sat munching slowly as he listened to the call.

"*Vega Trans-atlantic* calling WRVT . . . *Vega Trans-atlantic* calling WRVT . . . Standing by." Lanard switched on his receiver and waited patiently. Minutes passed before the reply crackled in the earphones. "WRVT . . . standing by . . . go ahead, Jimmy."

"Hello, Stevens. What's the latest report on that embryo hurricane that's skirting the Atlantic coast?"

"My information is rather vague. It hasn't struck yet. It seems to be wild . . . and is plenty wide of the coast. Be sure and keep your eyes open for it. The last I heard of it was at seven, and it was

swinging northeast for the Bahamas. How's your speed?"

"A tail-wind at six thousand. Anything else for us?"

"Nope, sorry."

Noon crept past. Then evening . . . and soon the night cast its sombre robe over the skies, seeking as to hide the last scarlet tint of the sun. And still the tail wind favored the Lockheed.

The Captain was at the controls. The dash lights outlined the rugged jaw that angled so far forward. The cheeks above that jaw seemed to have grown more gaunt from the tension . . . and the eyes, characterized by their fierce brilliance, had gathered shadows of weariness.

Lanard entered. His eyes swept the instrument paneling . . . to come to rest on the oil pressure gauge. It was either sticking or else the oil pump was impaired.

He turned away in despair and sank into his chair at the chart table. Trouble. Persistently dogging their steps. Trouble. . . .

8:00 P.M. Carroll and Lanard were eating side by side, seated on the cot. Kingsford was at the controls, casting uneasy glances at the lowering fuel pressure needle.

"While you were sleeping," Carroll said, "I picked up a call from a coast guard station. The low area is expanding. Nobody knows quite what to make of it. It's traveling northeast to a new extreme for a hurricane."

Lanard rose and crossed to the chart table. "We'd better swing due west. No use taking chances. Kingsford," he called, "Change your compass course to 280°." Then he opened the Vega's log. " . . . July 14, 8 P.M. . . . Coast Guard reports low area expanding and traveling northeast. Believe it dangerous. Am changing course to 280 in attempt to evade it. Weather here deepening. Clouded areas increasing. Having trouble with engine . . . probably fuel pump. Seas below growing heavier. . . . "

A sharp burst of wind swayed the fuselage.

3:00 A.M. The navigator was searching the surface below with anxious eyes. The sea was running heavier, with the wind gnawing the wave caps into white foam. "Think it's too rough?" Kingsford was at his side.

Lanard frowned. "I'm afraid so. But I'm going to try it. Stand by for flare!"

"Fire!"

The pilot released the lever. The sphere glistened in the raw early-morning light as it plunged downward. There was one puff of smoke, then the waves claimed the flare. Lanard rose from his knees. "No go," he declared abruptly. "Well, I'll have to do some reckoning to find our position." He slid into the seat at the chart table and found a clean sheet of paper. Three o'clock ante-meridian. The Vega's last position on the chart represented eight o'clock post-meridian. That meant seven hours flight over the broken seas.

Since the wind had not changed greatly from the time of the last reading, he decided to use the last windspeed reading as his present windspeed. On the last reading, his groundspeed had been one hundred and sixty, the airspeed one hundred and fifteen and the altitude six thousand. Adding 1¾% for every thousand feet of altitude, their actual airspeed had been one hundred and twenty-seven m.p.h. The groundspeed less the actual airspeed left a windspeed of thirty-three m.p.h Having the actual airspeed and the windspeed, he referred to his table of wind and drift and found his degree of drift.

He then calculated his present groundspeed from the degree of drift in proportion to his actual airspeed. (Explained in Article III).

Kingsford watched him designate the Lockheed's present position on the chart. "Hmm," he murmured, "That's really making time. At this rate, we should make the coast in about six hours."

"Approximately. And make contact with Lowell and refuel within nine hours. How is our fuel holding out?"

"I'd better check again. The last time I looked, we had a wing tank capacity." He made his way forward, conscious of the increased unsteadiness of the air. Minutes later, he reappeared. "Jimmy," he called, "Come forward." The muscles of Lanard's lean jaws corded as he noted the suppressed alarm of the co-pilot. "The fuel . . . it's not . . . "

"No, not the fuel. It's . . . " he broke off and made a vague gesture with his hand. Lanard trailed him forward.

A heavy cloud bank lay to the southwest, shaggy clouds, darkly threatening. To the north, extending across the horizon, a straggled cloud line stretched, forerunners of the storm. The navigator, alarmed, glanced at his two companions. Their lips were compressed tightly into thin, strained lines.

"The wind's changing," Carroll announced.

"Find its direction. I'm going back

and try to pick up some dope on this blow." Lanard hurried aft to the wireless set and switched on the generator.

The monoplane was banking towards the north.

"*Vega Trans-atlantic* calling WRVT. *Vega Trans-atlantic* calling WRVT . . . standing by." The reply came promptly . . . but ominously marred by static. "WRVT standing by."

"Hello, Stevens . . . course 280 . . . coast approximately five hours distant . . . storm clouds approaching . . . barometer falling. What information have you concerning this storm?"

"The S.S. San Diego—lying to your southwest—reports storm traveling northeast . . . wide area . . . adverse winds on ten mile fringe . . . storm center wind velocity 80 . . . ceiling 1.2 . . . rain, with minimum visibility. Better try to climb above it."

Lanard's eyebrows were arched in a worried frown. "We're at six thousand now and the clouds seem to go much higher . . . try to locate ships below that might aid us if we are forced down . . . our oil pump is weakening and might fail completely in the added stress of the storm."

Kingsford was standing at his side as he looked up. "Nicky found the head wind at 290°, compass reading. He's bearing true to it. He believes that the windspeed must be at least forty."

"O.K. Art." The navigator read the chronometer at a glance. 3:30. "Tell Nicky to try and outclimb the storm."

Carroll's eyes were pinned on the altimeter. 6.5 . . . 6.9 . . . 7.2 . . . 7.5 . . . 8.1 . . . 8.4. He shook his head sadly as the wings mushed through the thin air at eighty-four hundred. That was their ceiling with the present load of fuel and supplies. Eighty-four hundred. On the left, a pinnacle of dark clouds extended upward. On the eight thousand level, cloud banks swept nearer, tinted an ugly, dark purple.

There was no hesitancy in the manner that the storm struck. It came with a violent gust of wind that flung one wing down. Purple robes encompassed the Vega. Then rain drummed savagely on the fuselage, hammering with all the fury of an element gone mad. The chronometer, in its heavy wooden box, arched its slender hands to four A.M.

Carroll ruddered straight into the teeth of the gale. The wind tugged and snatched angrily at the Vega, but the valiant Pratt-Whitney droned on, solidly reassuring. The compass course was 135°. The Sperry horizon was lurching. Water streamed down the pilot windows, gleaming with the reflections of the cabin lights.

Five A.M. The oil pressure was nearing zero. It was subsiding with maddening consistency. When it reached zero, and the oil circulation ceased, the overheated bearings would expand until the connections became so tight that they would lock.

"Better locate help," Carroll told Lanard.

"O.K." He staggered aft, slipped into his metal chair and switched on the transmitter.

Then trouble again. The motor's rev's lessened, and the monoplane began losing altitude in a flat glide. The motor picked up. Then promptly lost way again. The hazy masses of clouds rushed past. Somewhere below was the broken, heaving surface of the sea.

Kingsford lurched into the compartment. "It—it quit," he announced, dazedly, "The oil pump . . . it quit." The words lanced the navigator's heart. It paused its rhythmic beating, then began hammering with erratic alarm. He turned to the microphone. "*Vega Trans-atlantic* calling WRVT . . . *Vega Trans-atlantic* calling WRVT." His voice had lost its steadiness. It vibrated with a hint of frantic desperation. The silence rebuked him. Moisture beaded his forehead.

"*Vega Trans-atlantic* calling WRVT . . . *Vega Trans-atlantic* calling WRVT The knuckles of his hands grew white from his tight grip on the microphone. The drone of the Pratt-Whitney was gone. He could hear the harsh rush of wind and the faint, eerie whine of the taut antenna wires. Kingsford was shaking his shoulder. "Send a general S.O.S." the co-pilot yelled, "There must be some ships near."

Carroll, at the controls, was staring at the instrument panel, strangely fascinated. The Altimeter needle was crawling backwards with alarming persistence. 4.5 . . . 4.2 . . . 3.6 . . . 3.1 . . . 2.8 . . . The Sperry horizon was starboard wing down.

Kingsford was crouched at a window, watching the Vega pierce cloud layer after cloud layer, wallowing in the murky haze.

"S.O.S. . . . S.O.S. . . . VEGA . . . TRANS-ATLANTIC . . . MAKING . . . EMERGENCY . . . LANDING . . . AT . . . LONGITUDE 00.00 . . . LATITUDE 00.00 . . . AID IMPERATIVE . . . S.O.S. . . . S.O.S."

The wires were wailing in their fear.

"S.O.S. . . . S.O.S. . . . VEGA . . . TRANS-ATLANTIC . . . MAKING . . . EMERGENCY . . . LANDING . . . AT . . . LONGITUDE 00.00 . . . LATITUDE 00.00 . . . AID . . . IMPERATIVE . . . S.O.S. . . . S.O.S."

The Vega plunged through the last cloud layer There was a sudden view of the grey water. Carroll jerked the Vega out of its dive with an abrupt shifting of the stick. The waves were yards below, staggering into each other in their confusion. Huge waves . . . that dwarfed the Vega. No flying ship could withstand the battering of those waves once it fell into the sea's grip.

And Captain Carroll knew it as he leveled off for a landing on the surface.

THERE YOU ARE, CADETS! Plot the course of the *Vega Trans-atlantic* as given and determine the Longitude and

Latitude (00.00 . . . degrees and minutes, and North, East, South or West—i.e., 19.52 E—) of its emergency landing. Mail your answer with the map to NAVIGOID CONTEST JUDGE, MODEL AIRPLANE NEWS, 551 FIFTH AVENUE, NEW YORK CITY.

The map given here may be redrawn to larger size. If you undertake to do this be sure you make the larger redrawn map neat and *accurate.*

More Problems will be given in future issues of MODEL AIRPLANE NEWS.

Proportioning Your Model for Stability—Part No. 2

(Continued from page 19)

analyze, every maneuver may actually be classified as a rotation about any one of three axes or as a combination of two or three of such simple rotations. Thus there are only three fundamental forms of stability, each one pertaining to rotation or resistance to rotation about one of the three axes. The three forms are lateral stability, a function of rotation about the longitudinal axis; directional stability about the vertical axis and longitudinal stability about the lateral axis. The principles governing these three forms and their resultant combinations have been discussed at length in chapter No. 3.

It will be shown now how these principles may be applied to the design of the physical structure of the model in order to give it a high degree of stability while it is passing through all phases of flight.

Lateral Stability

The most efficient way to stabilize your model laterally is by the use of a dihedral in the wings. A dihedral is incorporated in a wing by making the wing of such shape that the wing tips are higher than the center portion. The simplest way to accomplish this is to build the wing with a single crease at the center so that the two wing halves slant upward from the center towards the wing tips. (Other forms of stability are discussed in chapter No. 3).

The proper amount of dihedral for any particular design of model is important. In this case the center of pressure should be well above the center of gravity. Also, as the model is being designed for stability, a large amount of dihedral should be used; first in order to bring the centers of pressure high on each half wing, though the center point of the wing passes beneath the line of thrust as specified previously and second to create a high degree of lateral recovery. An average amount for this type of ship is a *one* inch elevation of each wing tip per foot of wing span. The value of the dihedral, therefore, should be considerably more than this. About a 1¾ inch rise on each tip for every foot of span will be satisfactory. As the wing span is 24 inches or *two* feet, each tip should be raised *three and one-half* inches above the center chord line of the wing. This is equivalent to 14 degrees elevation from the horizontal of *each* wing half. (In a previous article it was stated that each wing half would be raised *two* inches per foot of span. This was a mis-statement. It would provide more stability than is actually needed, with an accompanying undesired loss of lift.)

Directional Stability

The fin or vertical tail surface is the controlling factor in directional stability. Its area and the distance at which it is located from the center of gravity (center of wing) determines the amount of directional stability any particular plane will possess.

Fin Moment Arm

The general rule (discussed in chapter No. 2) states that the fin moment arm, or the distance of the fin from the center of the wing should be equal to about *one-half* the wing span and never less than two-fifths the wing span, if a *high* degree of stability is desired so that the model will fly *consistently* under all conditions and unless the fin has abnormally large area to compensate for the short moment arm. Another important fact which makes a long moment arm desirable is that it reduces the angle of yaw and imparts steadiness to the ship.

Let us establish the moment arm length, therefore, as equal to one-half the span or 12 inches *as a minimum.* No harm will be done if it is slightly longer, 14 inches, for instance. The exact length cannot be established until the exact balance of the model and the correct flying position of the wing on the stick is known. At least it will be considered while carrying out the design of the plane that the moment arm will be between 12 or 14 inches in length, say 13 inches as an average. (See Fig. No. 112).

Fin Area

On a rubber powered model the general rule for fin area states that the fin area should not be less than 11% of the wing area for the stick type of model when the moment arm is equal to *one-half* the wing span. If the moment arm is less, then the fin area should be larger than 11% in the same proportion that the moment arm is shorter than one-half the span. That is, the product of these two quantities should be a *constant* on any particular airplane.

On gas models the fin area can be much less as the weights of the model are more concentrated. In this case the fin area should not be less than 6% of the wing area. Though this is irrelevant to the case of the rubber powered stability model being designed here, it shows however the difference in this phase of the question between the two types.

The dihedral angle of the wing has a bearing on the size of the fin. The larger the dihedral the larger the fin should be. Our stability model has a large dihedral, unusually so. In this case, though the moment arm may be *more than one-half the span,* it is wise to specify that the fin should have an area of about 11½% of the wing

area. This amounts to about (8) square inches and the pattern of the fin should be carefully laid out to equal eight square inches. Be sure you check the area before proceeding with the construction.

There is a more elaborate but more accurate way of determining the fin area which takes into account the type of airplane and its body proportion. This entails the use of a formula however. Those who can or care to use simple algebra may employ this method. The formula for the fin area of a stick model is as follows:

$$a_F = 0.1(A/M)(3+N+0.58\sqrt{S\,T_r}).$$

In the formula, (a) the fin area required: (A) the total wing area: (M) the fin moment arm: (N) the distance from the center of gravity to the propeller bearing face: (S) the wing span: and (T_r) the tip rise, or the number of inches *each* wing tip is raised above the wing center section. All of the values are in inches or square inches.

One value, (N), appears in the formula which has not been considered. This is the length of the nose of the model. Usually in stick models with landing gears this length is about *one-half* the moment arm length. However, it is desired that the nose be extremely short for the sake of stability, which will be made possible by the use of fairly heavy wheels and a light tail group. Therefore we can assume in this case that the nose of the model will be only about 40% of the moment arm (M). As (M) is about 13 inches, then (N) will be equal to about 5 inches.

Now to solve for (a_F), insert the correct values for the symbols in the formula:

$$\text{then, } a_F = 0.1\left(\tfrac{70}{13}\right)(3+5+0.58\sqrt{24(3.5)}).$$
$$\text{or } a_F = 0.1(5.4)\,[8+0.58(9.17)]$$

Then $a_F = (0.54)(13.3) = 7.2$ square inches.

Therefore the area of each side of the fin should be equivalent to (7.2) square inches.

This value is a little less than the value specified by the general rule which does not take into account the unusually short nose that this model will have because of its heavy landing gear and light tail.

Too much fin area, however, is not a fault unless it is very much too large, so the value of 8 square inches specified by the general rule would have been quite satisfactory in spite of the fact that less could be used with safety as indicated by the formula solution. In our stability model the value of 7.2 square inches will be used.

Proportions of Fin

The proportions or shape of the fin are not extremely important though a fin whose height is not less than (105%) or 19/20 of its maximum width is advisable. This is a reasonable proportion for our model.

The shape of the outline of the fin has little effect aerodynamically, but slightly less resistance may be induced by designing it with a graceful curved outline. At least it will give pleasing lines to your "brain child."

Next month we will continue by showing how the stabilizer is designed. Until then—

Air Ways—Here and There

(Continued from page 27)

Ison made the trick photo, which was sent to us by Jim McCrackin of 608 North West 31st Street, Oklahoma City, Oklahoma. As a final stroke, that is not all, Wiley Post's autograph is on the fin. If your eyes are good enough you may be able to see it.

Another remarkable picture of a model in flight, picture No. 8, has been sent to us by Donald Boardman of Underhill, Vermont. The small plane you see hovering over the Vermont landscape is not a real ship, but one of his models "going places." In order to brave the wintry weather of Vermont one must be an ardent model fan. The writer speaks with a great appreciation of this fact, for he has attempted this on many occasions when very little of the mercury in the thermometer was showing.

The model shown is a Curtiss Falcon Observation of twenty-four inches wing spread. The day the picture was taken the temperature was ten degrees above zero. Many model fliers may not know that cold weather hardens a rubber motor to such an extent that it loses about

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A Forgotten Pioneer

(Continued from page 7)

were made for attaining the highest altitude yet reached by heavier-than-air craft.

Shortly afterwards an altercation arose between the two aeronauts with the result that Baldwin ceased his connection with the experiments. Not to be thwarted at this stage, Montgomery secured the services of Daniel Maloney, an acrobat who, under the name of Professor Jerome Lascelles, had gone in for the more ambitious aerial work of parachute jumping. Montgomery put his pilot through an extensive ground school course and then with two gliders transferred his activities again to the Santa Cruz Mountains. Here Maloney undertook a thorough course in gliding and Montgomery taught him all he knew about the manipulation of the machine's controls.

At last all was ready and on March 16th, 1905, a hot-air balloon was prepared for flight. Secured to the bag was the twenty-four foot glider weighing only forty-two pounds. Made of spruce, cotton cloth and steel wires, it had proven itself sufficiently strong to withstand normal gliding. Upon being released the balloon arose rapidly and at 800 feet Maloney cut the manila securing line. Somewhat bewildered, the pilot permitted the craft to assume an unusually extreme bank and it returned to earth in what would now be called a tight flipper-turn. Fortunately, Maloney recovered control in time to level off to a reasonably good landing.

Two days later, the test was repeated but this time the glider was not launched until it had reached an altitude of 2500 feet. The results were much better and the pilot took full advantage of the control offered by wing-warping. A third attempt was made on March 20th, but Maloney was unable to free the glider and was forced to parachute his balloon to earth. However, he went aloft immediately afterwards and made a perfect glide from 3,000 feet, landing within 100 feet of a predetermined spot.

Montgomery now felt that the time was ripe for a public demonstration of his machine. A few rumours had reached the newspapers of some extraordinary flights being made at Santa Cruz, but no inkling of the real truth had leaked out. Therefore, when the flight was announced for the twenty-ninth of April, there was a huge and curious audience, including distinguished visitors as well as casual observers. The day was fine, and the glider, the "Santa Clara" was wheeled out and duly blessed. Then Maloney appeared on the field with a jaunty swing, his 142 pounds encased in violently red tights.

The work of inflating the large bag got under way as the fire in the pit under the balloon was ignited. The craft was secured to the ground with stakes although, as preparations drew to a close, the securing lines were transferred to willing hands amongst the crowd. It was planned to permit the balloon to rise for a few feet in order that photographs could be taken, but the untrained ground crew became confused and let go the ropes on one side. This caused the suspended glider to gyrate about madly, and Maloney gave the command, "Let go!"

The swinging machine almost dislodged the pilot, but the apparatus settled down in short order as it rapidly gained altitude. At 4,000 feet the hot gases cooled off and the balloon began to lose shape. Cutting loose, the pilot began his descent. The tremendous crowd could scarcely breathe until it saw the "mechanical bird" detach itself and undertake a flight of its own upon which the spectators "went almost wild with enthusiasm." The glider under full control of Maloney put on a sterling performance with seven complete turns one of which was banked to nearly ninety degrees.

For a moment the crowd was too awe struck to move, even after the glider had dropped out of sight behind an orchard. Then suddenly it came to life! Wagons and lighter buggies began the race to the landing field, three-quarters of a mile away, which, incidentally, had been selected before the ascent. Horses were lashed into a lather. Never had bicycles been pedaled so furiously. Never had small boys gotten under the feet of their elders as they did that day. Everyone wanted to see the pilot and his remarkable machine. But the stampeding crowd was met by Maloney who had already dismantled the craft and was modestly walking back to the University with his glider on his back.

The only damage of the day resulted from

the dropping of a grappling hook from the balloon after it had attained a considerable height. It passed through the roof of a house and landed alongside an elderly lady who was rocking in a chair. The dangerous possibilities of flight were discussed following this incident.

The many scientific men who witnessed the experimental flight were deeply impressed and no less an authority than Alexander Graham Bell said of it, "All subsequent attempts in aviation must begin with the Montgomery machine."

With congratulations showering upon him, the Professor began to make plans to carry on his experiments upon even a larger scale. He planned to establish a large training station upon the slopes of Mount Hamilton. He proposed building gliders capable of carrying two or three men so that he could personally instruct and direct his students. Maloney stated he could fly from Santa Clara to San Francisco. Thus, while the possibilities of soaring flight were discussed, the use of engines as a motive power appears not to have been considered seriously, if at all.

As inventors before and since have discovered, Professor Montgomery had found difficulty financing his operations. Now, however, this problem appeared to have been overcome for people everywhere were anxious to witness the sensational flying of Maloney, and it was estimated that not less than $1,000 could be cleared at such exhibitions. For example, it was announced that a second public flight would take place one week after the exhibition at Santa Clara, and the "San Jose Herald" recorded that "excursions from all over the state will be run on the day in question."

During the next few months several successful flights were carried out throughout the San Francisco Bay region. This permitted Montgomery to acquire five hot air and one gas balloon as well as five gliders, termed "aeroplanes." Moreover, two other eager aeronauts, Wilkie and Defolco, were inducted into the mysteries of flight and the small organization soon had a waiting list of sixteen would-be students. Montgomery was instinctively cautious and constantly warned his pilots to be careful and to observe restraint in their flights. He even went so far as to restrict the movements of the controls of the machines when they were to be used by his two new pilots.

During the latter part of June, 1905, an unfortunate incident occurred before a large pay-admission crowd gathered at Oakland, California. The audience had heard of the thrilling flights put on by the courageous Maloney and had come prepared to extract every penny's worth of thrill out of the hazardous undertaking. As efforts were made to secure the glider to the inflated bag, the balloon broke loose to rise in solitary glory. A low murmur passed through the crowd, many of whom were skeptical of the entire proceedings. To quell the loud protests that were being voiced, Montgomery immediately began to inflate a second envelope.

When filled to overflowing, the glider was firmly fastened in place. However, in their anxiety to make haste, the ground crew permitted the balloon to take the air on the run instead of easing it up. Consequently, the balloon shot upward with the glider swinging below like a mighty pendulum. After such a flailing it would have been a foolish pilot, indeed, who would have entrusted his life to the machine without a thorough ground inspection. Moreover, Montgomery had always instructed Maloney to parachute the balloon down rather than use the glider in the event it had been damaged during the take off. Thus, Maloney returned to earth with the deflated balloon and the relatively severe landing completed the destruction of the glider.

Upon returning to the point of take off, Maloney was amazed to find a small riot in progress. Cries of "faker" assailed his ears from all sides. The skeptics were convinced that the entire scheme was impossible, anyway, and moreover they wanted their money back in a hurry! This demand was readily agreed to and when the day was ended Montgomery found that he was not only out money, but he had lost one balloon and one glider.

But Maloney's loss was even more severe. Raised in a circus, he had been bred in the tradition that "the show must go on" and the insults of the surly crowd nearly broke his heart. It was too late to make a third attempt and Montgomery's troupe retired from the field of battle as best they could, followed by the taunts of the mob.

On July 18th, 1905, the League of the Cross Cadets was holding a huge picnic in San Jose. Both the Professor and Maloney numbered many friends in this organization and they readily agreed to furnish the piece de resistance for the occasion by flying a glider dropped from a balloon. Prepara-

tions for the flight went along smoothly and Maloney brought forth great cheers as he appeared in his gorgeous costume. Waving his hand to some of his friends, he took his place in the glider. Then occurred the thing that is incomprehensible in the light of their experience only a few days previously. The take off was once again bungled and as the balloon arose too quickly it snapped the glider around violently as though deliberately trying to wreck it.

Again Maloney was faced with the decision of whether or not he would use the glider or parachute his balloon to the ground. Montgomery's warnings were in the back of his mind, but fresher than they, and more compelling to a showman, were the cries of "faker" and "coward" which he had so recently heard at the Oakland demonstration. These latter decided him! As the balloon attained its ceiling, Maloney reached up and cut the line which secured his machine. There followed the sudden drop which he always experienced before he gained control of his craft. But, this time, there was a sharp crack as the wing spar broke at an altitude of about 3,500 feet. Down, down ——.

After Maloney's tragic death, Montgomery was unjustly accused of sending another man to his death in order to further his inventions. He was howled down by the fanatical as a "monster." Forgotten by his critics were his own solo flights made at the inception of his man-carrying gliders, flights made to test the stability and control of aircraft. The Professor was much upset by the accident and as most of his financial backing was withdrawn shortly after because of the San Francisco earthquake his experiments with aeronautics came to an end for the time being.

In 1910, however, he again took up aviation. In October, after flying a 120 pound glider for 150 yards, he crashed from an altitude of twenty-five feet. Subject to vertigo, the Professor apparently lost control of his machine, for it fell on one wing and turned completely over causing him to strike his head on a wing fitting.

Thus died one of the pioneers of gliding; a man who independently developed wing-warping control; who provided the most spectacular flying known up to 1910; a man who is relatively unknown today because he failed to install an engine in his highly successful gliders. In spite of this, his early study influenced the aeronautical world of 1900 and it is undoubtedly true that his work indirectly assisted in the final solution of flight by man.

Building a Flying Scale Dewoitine D-535

(Continued from page 15)

stabilizer brace is streamlined from 1/16"x⅛" stock.

The stabilizer is silver. The fin is silver but the rudder portion is left white so that only the red and blue rudder stripes need be painted. The elevator and rudder hinge lines are designated by thin strips of black tissue doped or cemented to the surface.

As this is a French job, the usual circles and stripes are reversed; i.e., the center of the insignia is blue instead of red, the outer circle being red.

Landing Gear and Skid

The struts are all shown full size on the plan. The front landing gear strut is streamlined from a piece of ⅛"x½" stock. The others are all ⅛"x¼" as is the spreader bar. Bamboo pegs are inserted in the lower ends of the main landing gear struts. The spreader bar is forced on these pointed pegs as seen on the side and front views. When cementing the struts to the fuselage, use pins to hold the work in position. The axles are of .028 wire and are bound in place as well as cemented. The wheels are 1½" in diameter.

The shoe of the tail skid is a flat piece of bamboo bent as shown in the side view. A straight pin is forced through the shoe and a rounded piece of ⅛" balsa also visible on the side view. The upper end of the pin is then bent so that it can be sunk in the rudder post. The whole skid unit is cemented.

Wings

Cut the main spar from 1/16" sheet to the shape required by the pattern superimposed on the wing plan. Using the rib pattern given, cut all the ribs with the exception of the two noted from 1/32" sheet. The two ribs excepted are cut from 1/16" sheet. The leading edge is half rounded ⅛" sq. The trailing edge is ⅛"x¼" scalloped as shown. The wing tips and the center section cut out are of 1/16" sq. bamboo bent around a candle flame. Two parallel strips of 1/16"x⅛" are built into the lower surface of the center section as shown. A piece of 1/16" sq. is built into the upper surface as seen on the wing plan after the dihedral has been incorporated in the

structure so that the dihedraled portions of the wing will retain their proper angle.

Note that the wing is cracked for dihedral at the center line. The taper in the wing starts at the third rib out. Both the top and bottom surfaces of the wing are tapered or sloped from this point. The dihedral measured at the third rib is ⅛".

To cover use separate pieces of tissue for each of the inclined or tapered surfaces on the top of the wing. The bottom of the wing is covered with one piece.

The wing is entirely silver in color. Designate the aileron lines by the use of black tissue.

Center Section Struts

All the center section struts are streamlined and cut to size from ⅛"x¼" stock. The lower ends of the outer struts have bamboo pegs inserted in them. When assembling the finished center section struts, force these pegs into the upper end of the landing gear struts. Use pins to hold the struts in position when cementing them to the fuselage. Note that there are inner struts at the rear only. These struts and the outer struts at this station form a pyramid.

The wing is temporarily pinned to these struts so that the assembly can be checked for alignment. A slight correction is made by trimming the excess strut length with a razor. A major error naturally calls for realignment of the struts to be used or the substitution of a new strut for the one that is causing the trouble.

Propeller and Motor

The nose plug as shown in the detail is made by laminating a piece of ⅛" sheet and a piece of 3/32" sheet. The ⅛" sheet fits within the circular opening in the nose block. Two key pieces are cut from ⅛" sq. stock. These keys fit slots cut in the front of the nose block.

The propeller is cut from a block 8"x1½"x1". The main cone is carved intergal with the block. The tips are not rounded until the blades have been carved. The finished propeller should balance perfectly. The shaft of .028 music wire is bent to shape at the propeller end and imbedded in the face of the hub. Cut two tin bearings in accordance with the patterns given and bend them to shape. One is forced into the face of the nose plug the other into the rear of the propeller hub. Place a loose washer and the nose plug on the shaft and bend the rubber hook.

The motive power normally is six strands of ⅛" flat rubber.

Flying the Model

Test the model over deep grass if possible. As an alternative, test it on a few turns R.O.G. As the proper balance is attained increase the turns gradually to capacity. A small piece of lead is used if necessary for balancing.

The test flights of the original model were far beyond expectations. The Dewoitine parasol design makes a perfect flying model as you will agree when your ship reaches the test stage.

Bill of Materials

1—1/16"x2"x36" sheet balsa
1—1/32"x2"x24" sheet balsa
1—1 1/16" sq.x ⅛" sheet balsa
1—1 1/16" sq.x3/32" sheet balsa
1—1/16"x3/16"x24" strip balsa
2—⅛"x¼"x36" strip balsa
1—⅛"x½"x6" strip balsa
1—1/16"x3/16"x24" strip balsa
2—1/32"x3/16"x24" strip balsa
1—⅛" sq.x24" strip balsa
1—⅛"x1/16"x24" strip balsa
1—3 7/16"x⅞"x9/16" block balsa
1—2"x2⅛"x2½" block balsa
1—3⅜"x1⅜"x11/16" block balsa
1—2⅞"x1⅛"x⅜" block balsa
1—1⅞"x¼"x⅝" block balsa
1—8"x1½"x1" block balsa

Miscellaneous

1—1 oz. cement
1—2 oz. clear dope
2—sheets superfine tissue
1—pr. 1½" wheels
6 ft. ⅛" flat rubber
1 ft. .028 music wire
2—1/16"x¼" flat bamboo
scrap celluloid
silver bronze powder and liquid, or silver dope
4—2½" French circles

Frontiers of Aviation

(Continued from page 13)

working on TWA's experimental DC-1 and may attempt a transcontinental sub-stratosphere flight in it with the hope of breaking his present record made by him several months ago in a Northrop Gamma. The late Wiley Post proved the practicability of sub-stratosphere flying, and this may be an important phase of aviation development for 1936. Howard Hughes is now building a pursuit plane for the U.S. Army Air Corps according to recent reports.

Mr. Tom Shelton, designer and builder of the Gyro Crusader, has also been talking of flying in the stratosphere. He claims that his present four-passenger plane with sealed cabin could fly at about 300 m.p.h. at 35,000 feet, crossing the Atlantic in 12 hours! His proposed six-place low-wing ship is to be powered by two of the new 250 hp. Menasco engines. Another added feature over its predecessor is a retractable undercarriage. The plane will be of all-metal construction and will cruise at well over 200 miles per hour. Mr. Otto Timm, in whose shops the new Crusaders will be built, said that he will go ahead with construction of his own twin-engined bi-motor high-wing monoplane.

On February 10, 1936 before the Copeland Committee, Leighton W. Rogers, president of the Aeronautical Chamber of Commerce of America, Inc., made the following statements:

"During the next few years, with present knowledge and constant improvement, the top speed of military aircraft should increase by at least 30 per cent, bringing sea level speeds to about 300 m.p.h. and speeds at altitudes to about 375 m.p.h.! Fighting planes should be capable of operations at 40,000 feet, bombers at approximately 30,000 feet; and they should be practically invulnerable from the surface."

The Irvin air chute produced for Roscoe Turner for lowering a complete airplane is the world's largest and is 90 feet

in diameter. It contains 1,000 yards of silk, and 14,000 yards of cord. The longest seam on the chute is 282 feet.

From present activities at Vultee's factory it appears that a new Vultee pursuit plane will make its appearance in the near future!

The famous racing pilot, Harold Neumann, is building a racer, perhaps Menasco-powered, for the bigger and better 1936 National Air Races. Last year Harold had his own Fordon-Neumann racer, a small low-wing ship, at Cleveland which showed up well in the smaller category races.

Five super-charged Menascos are reported to be on order for racing planes for this year's races.

Specifications of the new Stinson 1936 Reliant are as follows:

	R680-4 Eng.	R680-6 Eng.
Wing span	41' 7.25"	same
Length	26' 8.8"	same
Height	8' 6"	same
Wing area	256.5 sq. ft.	same
Lycoming engine	R680-4	R680-6
Horsepower	224	245
Empty weight	2260 lb.	2310 lb.
Useful load	1115 lb.	1290 lb.
Pay load	615 lb.	662 lb.
Gross weight	3375 lb.	3600 lb.
Fuel capacity	50 gal.	70 gal.
Oil capacity	4 gal.	5 gal.
Top speed	148 m.p.h.	150 m.p.h.
Cruising speed	138.5 m.p.h.	141 m.p.h.
Landing speed	48 m.p.h.	50 m.p.h.
Service ceiling	12,800 ft.	14,600 ft.
Rate of climb	715 ft./min.	850 ft./min.
Cruising range	400 mi.	560 mi.

We have been waiting patiently for a long time in the hope of hearing some startling news of a new plane from Europe with a performance that would put our planes to shame. However we are still waiting and from present evidences in Europe we still have a long wait. One of the big troubles is that all the foreign aircraft designers have been sojourning in this country for the past two years studying our aircraft set-up, which is of course highly commendable to our aircraft industry and certainly illustrates how observing the foreign designers are of good aircraft.

As an answer to our fruitless wait England may come forth with eloquent words on the excellence of their new Hawker low-wing fighter. It is true that we have no pursuit plane in our Army Air Corps with such good performance (and the present Grumman pursuits in the Navy may not have such a high top speed), but then none of these Hawkers are yet in actual service in England's Royal Air Force. Aerodynamically, the Hawkers are very favorable, but structurally we believe they would not meet with our Army's approval. Not many months ago Curtiss and Seversky had low-wing all-metal pursuits in competition at Wright Field that were as good or if not better than the Hawker, but both were deferred by the Army because of the obvious improvements that American aircraft designers can accomplish in pursuit plane design at a very early date. Northrop's pursuit possibly could outperform the Hawker. However the new Hawker shows a great improvement over England's former fighters and England is probably further advanced in the pursuit field than any other country in Europe.

Of much interest are the twenty-seven giant four-engined Short flying boats for England's Imperial Airways. The first ten of these boats are now well under construction. We in this country should watch closely their development as they are of the most modern all-metal construction.

In Germany in recent months there have been some excellent new planes produced that are worthy of much consideration. One is the Heinkel 111, a twin-engined mid-wing transport carrying twelve passengers. High speed is 214 m.p.h. with two 660 hp. liquid-cooled engines. Cruising range is 930 miles. With new 880 hp. engines the ship is expected to do 250 m.p.h.

Another new German product is the twin-engined low-wing training bomber built by Focke-Wulf. At a quick glance at the front of the craft it much resembles the DeHavilland Comets. Two 240 hp. air-cooled in-line Argus engines give the plane a top speed of 158 m.p.h.-cruising at 146 m.p.h.

Northrop has sold two all-metal low-wing planes to Canada's air force for photographic work.

Air Ways—Here and There
(Continued from page 41)

thirty per cent of its power. The colder it is the more power is lost.

MODEL NEWS FROM OTHER COUNTRIES

England

In England the "Flying Flea" has become very popular. This fact has prompted John F. L. Corkett of 56 Dalmeny Road, Carshalton, Surrey, to build a model of it to 1/20" scale. He has sent us picture No. 9, which shows the model and many of its details.

Mr. Corkett has seen the "Flying Flea" in the air on many occasions and says that it has struck him as being very airworthy. He also met and talked with Sir John Corden, the designer of the motor, and who was recently killed.

Mr. Alec J. Ingram of 54 Lugard Road, Aigburth, Liverpool, has been kind enough to send us picture No. 10, among other interesting data, which shows his very complete SE-5-A. It is built to a half-inch scale and the wings have the correct number of ribs and spars. Hollow metal interplane struts are used. The cockpit has full controls and the pilot has celluloid goggles. All these details are somewhat unusual. Mr. Ingram has equipped the pilot's coat with a fur lined

collar. (We are surprised he has left out the proverbial "flea" to give further realism to the fur lining). It required three months for Mr. Ingram to build the ship.

Federated Malay States

One of the most unusual model builders from whom we have had contributions so far is Mr. Too Chee Chew of Choosum Press, 131 Sulton Street, Kuala Lumpur, F.M.S. Picture No. 11 shows his Hawker Multi-gun Day and Night Fighter, which he has constructed from wooden cartons and different material which he could pick up. As one might imagine, airplane materials are exceedingly scarce and practically impossible to obtain in the Malay States. Mr. Chew's ingenuity has not been thwarted, however. The amazing part of all of this is that the model is a beautiful job and shows a quality of workmanship which would not be expected of one who is not intimate with an advanced group of model builders.

"The span of the ship is fifty-six inches and it is forty-eight inches long. It is equipped with a twenty inch propeller. The model is built so that all the parts are detachable, even the belly radiator and the wheel pants. Complete with rubber it weighs 2¾ pounds. About half a pound of rubber bands, such as those used in an office, drives the model."

Similar models of this weight have been built by Mr. Chew which fly very successfully. In fact this is not an unusual thing for him. A model of this type has flown one hundred yards, taking off from a basketball field.

Mr. Chew is extremely interested in obtaining information concerning all forms of model building. Will not some of our club members write and help this ambitious young man with his hobby?

Australia

An unusual fleet of planes is shown in picture No. 12. They were built by Gordon Hughes and Frank Furness of Wentworth Falls, New South Wales. Wentworth Falls is situated some four thousand feet above sea level and Mr. Freshman, who sends the picture, writes that the flying characteristics of models at that altitude are changed considerably. Model builders here in the state of Colorado have often spoken of the difficulty of flying models at high altitudes. Usually the duration is increased and the speed is decreased.

Mr. Freshman writes and tells us that interest in model planes is promoted in Australia by sound pictures of a number of the model flying contests. In the film pictures are shown of bomb dropping, tow gliding, parachute releases with frogs as passengers, and fifteen gas jobs flying and crashing. The film works up to quite a respectable little climax. It will be shown through the Commonwealth to stimulate model building.

In competing for the Angus and Coote Cup, D. Lee of Albury recently won first place with a flight of eighteen minutes, thirty seconds.

New Zealand

Mr. W. B. Mackley writes us from the Auckland Model Aeroplane Club of 8

Ascot Avenue, Remuera, S.E. 2, Auckland. He is the Club Captain. With his letter he sends us picture No. 13, which shows the R.O.W. microfilm model with which he broke the New Zealand Senior record with a flight of three minutes, twenty-six and four-fifths seconds. Mr. Mackley says:

"This model falls into the Senior Class B in your American classification. We notice that this time eclipses that put up by Bruno Marchi by about sixteen seconds."

Mr. Gordon P. Smith secretary of the Taranaki Union of Model Clubs. The headquarters are located at Brougham Street, New Plymouth, has been doing excellent work in New Zealand. The Union was started in March 1934 with the formation of the New Plymouth Model Flying Club. In March 1935 boys in Waitara and Stratford requested him to form clubs there, and now the Union is composed of the New Plymouth Flying Club, the Tariki, Okato, the New Plymouth Boys' High School Clubs and a Lone Flyer's Club. Mr. Smith is endeavoring to form clubs in eight other towns. We can expect to have some interesting news

CLUB NEWS

Massachusetts

News comes from Jack Golden of 37 Claflin Road, Brookline, Mass., of the Jordan Aviation League in Boston. He has taken the trouble to tell us something about a scale model contest that they have held there. It seems that this phase of model flying is becoming very popular.

Picture No. 14 shows Jack Golden holding one of his little flying scale Monocoupes, which has helped to win him first place in the series of contests this winter.

"Prizes are awarded annually after the New England Championship Meet, on the point basis (points plus flight time in seconds). First place is fifty points, second is forty, third is thirty, fourth is twenty, fifth is ten; plus time in seconds.

"Present point standings follow. They are official:

1. Jack Golden, 390; 2, Art Sampson, 333; 3. Art McLean, 194; 4. Hewitt Phillips, 130; 5. E. Worth, 101. Golden's best time to date is 41 min., 8 seconds.

Pennsylvania

From Mr. Jesse Bieberman of 3719 East Brighton Avenue, Philadelphia, Pa., comes the following news:

Philadelphia Model Airplane Association

Several meets have been held since the last report on the PMAA was printed in these columns. On February 22 the fifth Junior meet was held. William Wert, who is the Junior High point scorer since Robert Jacobsen, passed his sixteenth birthday, managed to retain his position although several other Juniors whittled his lead a bit. The times at this meet were very poor, high time being made by Matthew Fleck, a boy in the beginners' division, with an eight minute, eighteen second tractor flight.

Correspondents

Here are the latest additions to the list of "Correspondents Wanted": George Fager, Jr., 121-22 Fifth Avenue, College Point, New York; Ken Williams, 1363 Fifth Street, Columbus, Indiana.

"Gas Lines"

(Continued from page 28)

Place, New York City, writes us and makes a few suggestions which may be helpful to other gas model fans. He says:

"It seems that the only thing that holds back building a gas model among many rubber model enthusiasts is the financial outlay. I think the most logical thing to do in this case is the following:

1. A group of five or six boys should form a club, each member paying dues.
2. When there is sufficient money an engine can be purchased.
3. Each member may make his own plane, which is comparatively cheap, amounting to some five or six dollars which is within the reach of the average builder.
4. After this, the engine can be transferred back and forth to each member, and if the members so desire buy another engine out of club funds; thus distributing the engines among more members."

This may prove to be a very brilliant idea and will help to solve the expense problem for many builders.

John Czajkowski, of 12 Arlington Avenue, South River, who is secretary of the South River High School Model Aero Club, has more to say about reducing expenses of gas model flying. He says:

"We are building a KG-3 at present and had a very unique way of raising money for the motor. We staged a 'magic lantern' show in the high school auditorium and acquired the necessary funds."

Unquestionably many builders will be interested to hear news of the International Gas Model Airplane Association.

Up to the present time eight units have been established.

The Association now boasts of members in the following states: Alabama, California, Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Virginia, Washington, Wisconsin; as well as one member, David Hernandez, from Porto Rico; five members from Canada, and Alfred Van Wymersch from Belgium. The member who lives furthest away from the headquarters of the Association is Ben Tamashiro of Hawaii.

One of the biggest pieces of news for members this month comes as a surprise. The International Gas Model Airplane Association is establishing a very beautiful gold-bronze trophy to be held by the member of the Association who holds the duration record for the Association under its rules. When another member breaks the previous record the trophy will be passed on to him to hold until someone else surpasses his record.

Association by-laws and rules will be sent to members as soon as they are off the press, which will be in the near future. When they are ready, further announcements will clarify the purpose and value of the Association and establish the benefits to all gas model builders. Happy Landings until next month!

Beg Pardon—

On page 25 of the February 1936 issue the wrong illustration of the Cleveland Model & Supply Co. "C-D Monocoupe" appeared. A cut of the "Curtiss Wright Sedan" was dropped in by mistake. Our error—sorry.